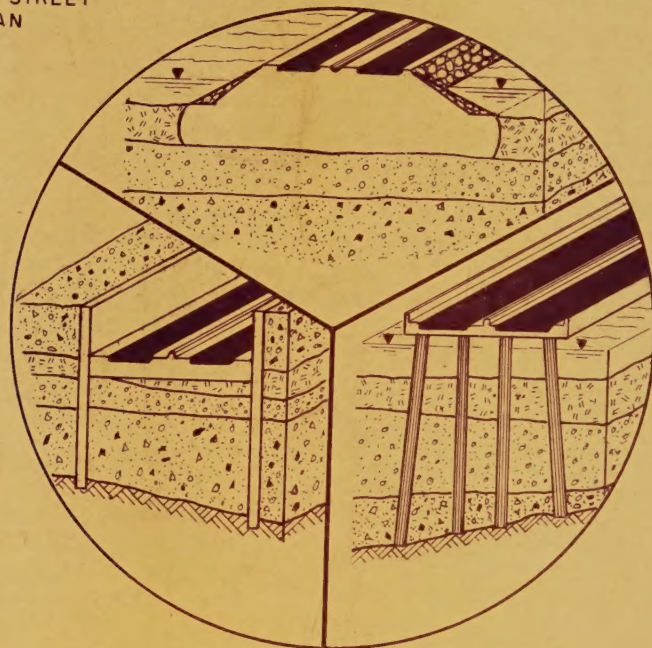
PRELIMINARY SOILS AND FOUNDATION STUDY

FOR THE
INTERSTATE ROUTE CONNECTION 518

WEST SIDE HIGHWAY

FROM THE BATTERY TO 42ND STREET
BOROUGH OF MANHATTAN
P.I.N. 0024.11.111



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

PRELIMINARY SOILS AND FOUNDATION STUDY

INTERSTATE ROUTE CONNECTION 518

WEST SIDE HIGHWAY FROM BATTERY TO 42nd ST.

PIN 0024. 11-111

BOROUGH OF MANHATTAN

E.V. HOURIGAN
PROJECT MANAGER
NEW YORK CITY WEST SIDE EXPRESSWAY
CAMPUS SITE
ALBANY NEW YORK

W. P. HOFMANN
SOIL MECHANICS BUREAU
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ALBANY NEW YORK

OCTOBER 1972

NEW YORK STATE
DEPARTMENT OF TRANSPORTATION

1220 Washington Avenue, State Campus Albany, New York 12226

October 16, 1972

Mr. Edward V. Hourigan
Project Manager
NYC West Side Expressway
NYS Dept. of Transportation
Building 5 - Room 108
1220 Washington Avenue
Albany, New York

Subject: Transmittal of Soils and Foundations Report for the Proposed West Side Highway PIN 0024.11.111

Dear Mr. Hourigan:

In accordance with your request and authorization to proceed dated January 13, 1972, this Bureau has completed an initial preliminary soils and foundations study for the proposed West Side Highway Corridor.

The report which follows represents an in-depth analysis oriented toward providing a basis for analyzing and evaluating foundation feasibility and estimated costs for alignment alternates within the proposed corridor. Final design studies for an established alignment will, of course, require further detailed investigation and analysis which we are prepared to undertake upon your authorization to proceed.

This Bureau's participation in this project has been under the direction of Mr. Richard S. Cheney, Senior Soils Engineer, under the writer's supervision. Formal acknowledgment is noted herein of the excellent cooperation received from Mr. J. Griek, Region 10 Soils Engineer and the Region's Soil Section. Close liaison has been maintained during the progression of this report with representatives of the Managing Consultants, Parsons, Brinkerhoff, Quade and Douglas and your office to insure that our studies provided the required information for this stage of design. We will be available to provide further assistance as necessary.

Very truly yours,

Wm. P. Hofmann, Director
Soil Mechanics Bureau

By:
Bernard E. Butler
Bernard E. Butler
Associate Soils Engineer

BEB:MVM

cc: Mr. G. W. McAlpin
Mr. A. H. Emery

CONTENTS

I INTRODUCTION

In accordance with your request and the authorization contained in your memorandum to this Bureau on January 13, 1972, we have completed a preliminary foundation design study for the proposed West Side Expressway Project. The corridor analyzed extends from the Battery to 42nd St. and is bounded on the east by the existing West Side Highway and on the west by the pierhead line. The scope of this task included: collection of existing subsurface data; performing additional preliminary borings where needed within the corridor, detailed laboratory and field testing on samples from these new borings; analysis and correlation of existing and new boring data; plotting of boring information on base maps; preparation of a detailed preliminary report on subsurface conditions and indicated foundation design alternates with related factors on estimated costs and construction considerations.

The new boring work, included in this report, was begun by State Forces from the Region 10 Soils Section on February 14, 1972 and completed July 6, 1972, at which time a total of 6 borings had been completed, representing 602 linear feet of soil boring and 79 linear feet of rock coring. The subsurface information logs for these borings are shown on Drawing Nos. 10 SM 1847A thru D. During this program, 54 undisturbed Shelby tube samples and 128 split spoon samples were obtained and subsequently analyzed in our laboratory. In addition, specialized soil testing was performed in the field including 20 vane shear tests to determine in-situ soil strength; testing for an indication of the corrosive potential of the soil by utilizing the Ceonor Corrosion Sound in the field and obtaining sulfate content from samples analyzed in our laboratory, and; utilization of geophysical soundings to determine generalized soil boundaries. The latter investigation which was experimental, was performed under a contract issued to Alpine Geophysical Associates Inc. on June 6, 1972 which was completed on June 26, 1972. The results of this study were, unfortunately, negative since the soil deposits explored were extremely soft, gaseous and not subject to interpretation by this or other types of geophysical methods. The Soil Mechanics Bureau furnished supervisory personnel for this study.

Summaries of the results of analysis of existing explorations are included herein in the form of subsurface profiles, cross-sections, and contour drawings. The results of selected laboratory tests have been tabulated, correlated, and plotted and are included in this report.

During this corridor study, generalized additional design data for specific alternate highway alignments and interchanges have been transmitted to Parsons, Brinkerhoff, Quade & Douglas, Managing Consultants for this project. However, no specific alignments within the corridor will be discussed in this report because their status on location, grade line and type of pavement support has not yet reached a stage which justifies a detailed evaluation. This report is intended to establish generalized foundation design criteria to permit relative assessments of various alignments within the corridor. Detailed foundation design information will be gathered and transmitted after the final alternate alignments are selected.

II SUBSURFACE CONDITIONS

The subsurface profiles and cross-sections contained in the Appendix (Drawing Nos. 1835A thru L), indicate radical variations in soil and rock conditions within the corridor. The bedrock underlying the area covered by this report belongs to the Manhattan Formation. The cores obtained consisted of a mica schist with numerous muscovite flakes covering the foliation surfaces. The rock is highly folded and forms ridges with major axes trending generally north-south. The low areas between the ridges are filled with glacial drift overlain by recent alluvial deposits. The glacial drift is composed primarily of red or gray glacial till. The red glacial till is younger and was deposited by ice moving in from the west, the older gray till was deposited by ice moving in from the north. These red and gray glacial tills are respectively described on the subsurface profiles included in the Appendix as either Red Brown Sand, Silt, and Gravel with Boulders, or Gray Sand with a trace of Silt and Gravel with Boulders.

The land portion of this corridor is covered with a mantle of miscellaneous fill containing all types of soil in addition to wood, concrete, and metal fragments. We feel that the soil samples extracted from the borings are not totally representative of the fill due to the large size material which was encountered but could not be sampled. A research of old New York City maps disclosed that the shoreline was located along Greenwich St. in 1767. The approximate location of this shoreline and the present bulkhead line is shown on Drawing Nos. 10 SM 1836A and B. Since this fill has been in place for many years we assume that the underlying soil deposits are fully consolidated under the weight of the fill.

It is worthy of note that fill material was encountered at great depths between stations 0 and 100 within the present bulkhead line and stations 30 and 65 near the pierhead line. This fill material was mixed with the very soft organic silt found above. We believe that this material was transported by means of large shear failures caused by uncontrolled filling over the very soft organic silt deposit.

On the river side of the bulkhead line many piers exist which extend varying distances into the river. The majority of these piers have not been in use for many years. During a pier's useful life, periodic dredging of the pier slip was necessary to maintain a navigable channel for docking. The sediments which flow into these pier slips are deposited to form a very loose soil matrix. Eventually as more sediment is deposited, the soil consolidates under its own weight. This type of recent deposition produces a "normally consolidated" soil deposit, i.e. the subsoil has never been subjected to any loading other than the weight of the soil which exists above.

The results of laboratory testing on samples from this deposit are shown on Drawing Nos. 10 SM 1840A & B, 10 SM 1842A & D, 10 SM 1845 and 10 SM 1846 A & B of the Appendix. The thickness of this soil deposit varies rapidly between adjacent piers because the soil immediately beneath the piers has never been dredged. Although we have not obtained a continuous profile of the actual river bottom we assume that it resembles a series of subsurface "hills" and "valleys" in the north-south plane.

Due to the unusual nature of the soil between the bulkhead and pierhead lines, the lack of existing data, and the expeditious nature of this preliminary phase of the project it was necessary to confine our preliminary boring program to the waterborne alignment. From these recent borings we have established the boundaries of various soil layers and ascertained the physical characteristics of each layer. Our laboratory testing was confined to the two compressible layers described on the profiles as "Gray Organic Silt with a trace of sand and shells", and "Layered Gray Organic Silt with a trace of sand, Gray Sand and Silt." Within the boundaries of each of these generalized layers certain variations exist with regard to strength and consolidation properties. Summarization and correlation of physical properties and strength and consolidation properties are shown on Drawing Nos. 10 SM 1840A thru C, 10 SM 1842A thru G, 10 SM 1845, and 10 SM 1846A thru C. These layers are next discussed in more detail.

A. GRAY ORGANIC SILT WITH A TRACE OF SAND AND SHELLS

This layer may be subdivided into two parts; the first being the recently deposited collodial material described above and the second being material which has been in place long enough to consolidate under its own weight and exhibit definite strength and consolidation properties.

The upper zone of this deposit is characterized by its black color and the amount of oil and other pollutants contained in the samples. This material is extremely unstable, corrosive, and compressible. Application of the lightest loads will cause shear failures or large settlements. Under load application the rate of consolidation and strength gain is too slow to permit a reasonable duration of stage construction without partial excavation. This material is so soft that the surface cannot be determined by ordinary soundings. An attempt to use geophysical methods failed due to pockets of gas and/or organic material causing damping and distortion of the reflection waves. If close river bottom control is necessary, we recommend utilizing sounding rods equipped with wire mesh screening pads having a large surface area.

The lower zone of this deposit has been in place for many years and contains considerably less organic material and more sand. The process of deposition was the same as for the upper zone, but no pollutants were found in samples from this zone. Also, the strength and compressibility properties of this lower zone are slightly better than the above. The important difference is in the more rapid rate of consolidation and strength gain due to loading in this lower zone. The drainage characteristics of this material indicate that a controlled sequence of loading would be feasible, although a large amount of consolidation may be expected from this portion of this stratum. Termination of any type of pile foundation is not feasible within this deposit.

In addition pile foundations which extend through this entire stratum are assumed not to develop any useful frictional resistance in either zone. A measure of the corrosive potential of the entire layer was estimated by means of the Geonor Corrosion Sound and by laboratory analyses to determine the sulfate content of all samples within this layer. The following table summarizes the results of this testing:

TABULAR SUMMARY OF CORROSIVE POTENTIAL DETERMINATIONS

GEONOR SOUND METHOD **

Location	*Test Depth (feet)	Current I(mA)	Resistance R(ohm)	Percent Depolarization
Pier 58	15	1[illegible]	[illegible].1	[illegible]1.2
100 ft	2[illegible]	[illegible]	5.9	[illegible]2.[illegible]
from	25	1[illegible]	6.[illegible]	[illegible]1.2
out-	[illegible]0	1[illegible]	5.9	[illegible]
board	[illegible]5	125	[illegible].1	[illegible].5
edge	40	11[illegible]	7.[illegible]	[illegible]5.9
	45	10[illegible]	7.[illegible]	[illegible]4.2
	5[illegible]	12[illegible]	6.3	[illegible]
	55	125	[illegible].0	[illegible]2.5
Pier [illegible]	15	[illegible]	[illegible]	5[illegible].3
100 ft	20	11[illegible]	[illegible]	5[illegible]
from	25	125	7.[illegible]	[illegible]2.[illegible]
out-	3[illegible]	1[illegible]	7.[illegible]	[illegible]
board	35	11[illegible]	8.[illegible]	75.3
edge	4[illegible]	125	6.[illegible]	6[illegible].7
	45	125	6.[illegible]	[illegible]2.5
	5[illegible]	125	6.2	[illegible]
	55	125	7.[illegible]	[illegible].1
Pier 72	15	115	7.[illegible]	[illegible]7.1
150 ft	2[illegible] [1]	1[illegible]	[illegible]	75.[illegible]
from	15	1[illegible]3	[illegible]	59.2
out-	2[illegible]	1[illegible]	[illegible]	5[illegible]
board	25 [2]	10[illegible]	[illegible]	55.3
edge				

1 Refusal @23.5 ft.
2 Refusal @28.5 ft.

PORE WATER SULFATE CONTENT

Drill Hole	Tube No.	*Test Depth (feet)	Pore Water Sulfate Content Parts per million ***
P66	T1	20	52[illegible]
	T[illegible]	30	[illegible]111
	T[illegible]	5[illegible]	2[illegible]95
	T[illegible]	6[illegible]	594[illegible]
	T10	7[illegible]	2041
	T12	80	1[illegible]65
	T14	90	3421
	T16	101	[illegible]5[illegible]5
	T1[illegible]	112	28[illegible]
	T2[illegible]	12[illegible]	1920
	T22	13[illegible]	157[illegible]
	T25	149	50[illegible]
	T27	1[illegible]0	[illegible]54[illegible]
	T29	17[illegible]	328[illegible]
	T31	1[illegible]0	[illegible]

* Test depths referenced from pier surface
** For additional information regarding the Geonor Method see Publication No. 42 of the Norwegian Geotechnical Institute-Oslo, Norway, 1961
*** Sulfate determination performed by N.Y.S. D.O.T., Materials Bureau

Our interpretation of these results indicates that this material is corrosive to steel piles at all depths tested. The test data indicates that a steel corrosion rate of up to 1mm per year can be expected for unprotected steel piles. In addition, the sulfate tests indicate an average value of 3400 parts per million (ppm) with a minimum value of 1570 ppm and a maximum of 5943 ppm. The U.S. Department of Interior - Bureau of Reclamation's Concrete Handbook considers the relative degree of sulfate attack as considerable for 1000-2000 ppm and severe for over 2000 ppm. In both cases the handbook recommends the use of Type V cement to prevent loss of material and strength due to corrosion. The effect on resistance to sulfate attack by increasing pile density with centrifugally spun precast piles is not quantitatively known, however, it is reasonable to expect this type of concrete to better resist sulfate attack.

This corrosion test data appears to be contradicted by field data gathered by the various agencies involved with waterfront construction along the Hudson River. The most recent study which discusses this subject was completed in 1966 by the Port of New York Authority and is described in a publication entitled, "Marine Piling Corrosion-New York Harbor." Therefore, we recommend that a detailed field study of pile corrosion in this area be made prior to designing foundations for corrosion protection. This study could be done on existing piles supporting the present waterfront structures, many of which are currently being demolished.

Further data could also be gathered on the pier foundations previously inspected by the Port Authority and contained in the aforementioned publication.

B. LAYERED GRAY ORGANIC SILT TRACE SAND, GRAY SAND AND SILT

This ancient alluvial deposit extends to great depths especially toward the northern end of the project. This deposit may also be subdivided into two zones of approximately equal thickness. However, the distinction between these divisions is basically with regard to the relative compressibility of each zone.

From a detailed interpretation it appears that the upper zone contains a larger percentage of sand and silt layers than the lower. This difference is best shown by the void ratio versus log pressure diagrams on Drawing Nos. 10 SM 1842F and G. Note that the compression index (C_c) for the upper zone is much less than the lower.

In general, both zones of this deposit can sustain the effects of moderately high loadings. Any resulting consolidation of this deposit will occur nearly as soon as the load is applied. In addition, friction pile foundations may be safely installed in this deposit with only small settlements resulting.

III RESULTS OF ENGINEERING FEASIBILITY STUDIES

Our foundation studies have been concentrated in three areas: pile supported structures, roadway embankment construction, and depressed roadway sections. All of the above alternates can be constructed within the boundaries of the subject corridor. However, in particular areas certain alternates are of a lesser degree of difficulty to construct and consequently less costly than others. Due to the weak compressible nature of the surface soils, spread footings are not recommended for any major structures within the subject corridor.

The following summary, supplemented by referenced drawings, will provide a rational basis for comparing design alternates and preparing preliminary foundation designs.

A. Pile Foundation Design Study

The properties of the subsoil within this corridor dictate that all proposed major structures be supported on deep pile foundations. Therefore, an exhaustive analysis was made to compare the desirability and economic feasibility of various pile types. The feasible pile types are listed on Drawing No. 10 SM 1644 which displays for each, the recommended design capacity in tons and the cost per ton capacity per foot of length. Due to the great depth to bearing and or the anticipated high loads to be supported only three types of high capacity piles were found to be economical.

A further analysis of the subsurface profiles within this corridor permitted a generalized segme[illegible]y segment breakdown in which similar pile foundation design alternates could be utilized. The results of this analysis and recommended pile types, lengths, and costs are shown on Drawing No. 10 SM 1641. Note that the estimated costs shown thereon are related to 1971-72 prices and do not reflect anticipated future changes. Lateral load soil resistance will not be analyzed until specific alternate alignments and anticipated design loadings are established.

In general the depth to a bearing layer of glacial till or ledge rock along any land-based alignment is relatively small, i.e. 50 to 100 ft. The exception occurs in the area between 22nd and 34th Streets where land alignments built close to the bulkhead line will traverse the edge of a deep gorge. In this vicinity pile lengths could approach 180 feet. A major problem on land-based alignments will be advancing piles through obstructions to bearing. For this reason we recommend that reinforced tips be added to all bearing piles. The price for these points has been included for recommended steel 14PP117 piles shown on Drawing No. 10 SM 1641.

The waterborne alternates will cross a variety of complex soil deposits in this corridor as shown on the enclosed soil profiles and cross-sections. A representation of the variable depth to rock surface is shown on Drawing Nos. 1636A and B. From a foundations standpoint, the most economical alignments can be achieved by skirting the edges of these deep gorges which have their major axes in a general north-south direction. All piles driven to end bearing will exhibit only negligible settlement under the recommended loads. However, if friction piles are chosen, the location within the gorge will determine the amount of expected settlement. These settlement estimates are beyond the scope of this report but will be included in future reports for appropriate alternates.

B. Embankment Foundation Design Study

In many areas of waterborne alignments within the corridor, roadway embankment could be used in lieu of structures. The sections shown on Drawing No. 10 SM 1638 indicate a preliminary determination of the requirements for embankment construction with two alternate side slopes. In addition, the cost estimates shown thereon have been subdivided to facilitate approximations for the geometrics required at different locations. The information displayed on this drawing was based on the following assumptions:

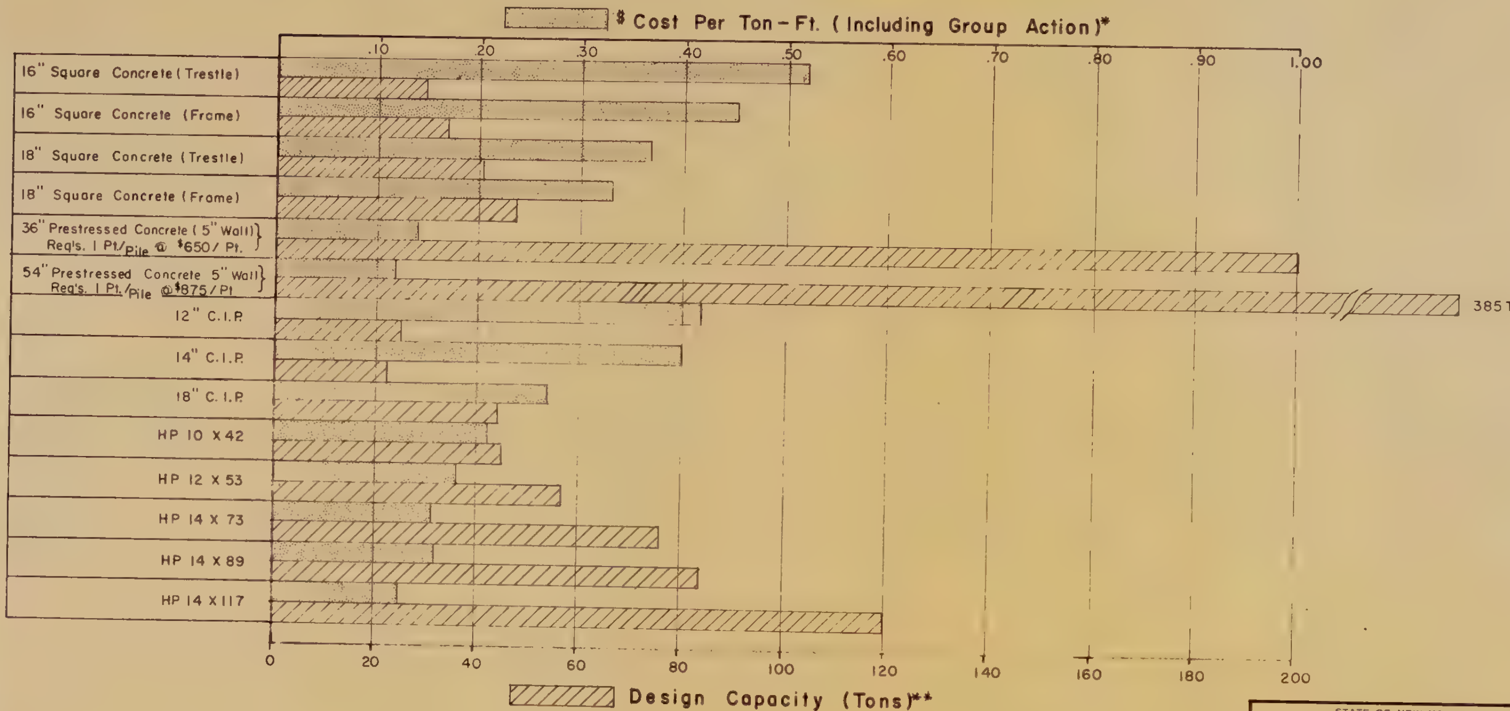
1. The location of the outboard toe of slope for an embankment cannot encroach on the channel of the Hudson River. The outboard limit is defined by the pierhead line as established by the U.S. Corps of Engineers.
2. Any excavation of organic material would be made with a hydraulic dredge directly loading into barges for disposal at sea.
3. Fill material could be used which was locally available (New York Bay area) and able to be placed hydraulicly underwater by controlled methods.
4. The final grade of the embankment would be 12 feet above the average existing water surface.
5. The excavation and fill quantities used for the cost estimates are based on average soil conditions along the corridor.

Of the two alternates shown on Drawing No. 10 SM 1638, the embankment section with a 1 vertical on 4 horizontal side slope is the most economical. The embankment section utilizing a 1 on 3 side slope is the steepest which may be safely constructed without additional special stability treatment such as relieving platforms. After the required excavation, either embankment alternate must be constructed in two stages, as shown on Drawing No. 10 SM 1638, with waiting periods beginning at the completion of filling for each stage. A six month waiting period is required after the first stage before embankment construction can safely continue to final grade. An additional one year waiting period is required after stage two completion to reduce differential embankment settlement to acceptable values before paving.

Sand drains will be required to reduce differential settlements in areas where the roadway embankment adjoins or straddles the existing bulkhead and at approaches to proposed pile supported structures. These sand drains should be installed by the non-displacement method. The approximate cost for sand drains required in bulkhead areas is estimated at $2500 per station per 10 feet of roadway width which extends from the bulkhead into the river to the top of slope location. The approximate cost for sand drains required at approaches to proposed pile supported structures is a lump sum of $50,000 per approach.

It is important to note that the organic material excavated to permit embankment construction could be utilized as fill in the construction of land between the existing bulkhead and proposed embankment. A cap of granular fill would be required over the organic material. The land so treated could be stabilized in about six years at minimal cost. If necessary the stabilization could be accelerated by the use of sand drains. In addition to creating usable land, this procedure

SUMMARY OF ANALYSIS FOR ALTERNATE PILE TYPES



*Group action includes adjustment of design capacity to account for pile spacing.

**An allowable stress of 9,000 psi was used for the H-Pile analysis.

PREPARED BY:

DRAWN BY:

CHECKED BY:

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42 ND STREET BOROUGH OF MANHATTAN
PIN 0024.11.111

PILE TYPE ANALYSIS

APPROVED 10/13 1972
DIRECTOR

DISTRICT NO. 10
COUNTY MANHATTAN

DWG NO 10 SM 1844

SUMMARY OF PRELIMINARY FOUNDATION DESIGN CRITERIA

PILE ANALYSIS FOR STRUCTURE ALTERNATES

Location: Corridor Segment	Location: Lateral Limit Within Segment	Pile Type	Allowable Load Cap. tons	Pile length ft: Range	Pile length ft: Average	Cost: Per ft. of pile	Cost: Per ton of load	Remarks *****
Battery - Liberty St.	-	-	-	-	-	-	-	Not applicable - see depressed roadway treatment
Liberty St.- North Moore St.	Bulkhead - Pierhead Line	54" dia. prestressed conc.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Pile length not expected to vary across corridor
North Moore St - Barrow St.*	Bulkhead-Pierhead Line	54" dia. prestressed conc.	[illegible]	[illegible]	[illegible]	*** [illegible]	[illegible]	Pile lengths increase from pierhead to bulkhead line
	East of Bulkhead Line	14BP1[illegible] w/pts.	120	[illegible]	[illegible]	[illegible]	[illegible]	Obstructions to pile driving may be encountered to 50 feet
Barrow St.- 14th St.	Bulkhead-Pierhead Line	54" dia. prestressed conc.	385	80-15[illegible]	115	*** $4[illegible]	[illegible]	Depth to rock increases sharply from east to west while uniformly increasing south to north.
	East of Bulkhead Line	14BP117 w/pts.	120	[illegible]	[illegible]	$[illegible].0[illegible]	$1[illegible]	Deepest area is [illegible] St. - rock varies uniformly in both directions
[illegible] St.- [illegible] St.	Bulkhead - 400' East of pierhead	54" dia. prestressed conc.	[illegible]	[illegible]0-150	[illegible]	[illegible]	[illegible]	Depth to rock rapidly increases from east to west
	400' East of Pierhead - Bulkhead	36" dia. prestressed conc.	200	150	150	** $28.[illegible]	$[illegible].00	Deepest part of gorge area - piles designed to carry load in friction
	East of Bulkhead	14BP117 w/pts.	120	85-95	90	$1[illegible]	$1[illegible]	Pile lengths do not vary significantly within segment
2[illegible]nd St. - [illegible]th St.	100' Either side of bulkhead line	54" dia. prestressed conc.	385	150-180	165	*** $4[illegible].00	$[illegible]	Obstructions to pile driving may be encountered
	100' west of bulkhead to pierhead	36" dia. prestressed conc.	200	150	150	*** $28.0[illegible]	$2[illegible].00	Gorge area - piles designed to carry load in friction
	100' east of bulkhead to western limit	14BP117 w/pts.	120	1[illegible]5-140	125	$1[illegible]	$15.[illegible]	Pile length uniformly increases east to west
[illegible]4th St. - 42nd St. *	Bulkhead to pierhead	54" dia. prestressed conc.	385	70-180	130	$45.00	$1[illegible]	Pile length uniformly increases east to west and decreases south to north
	East of bulkhead	14BP117 w/pts.	120	45-105	75	$16.0[illegible]	$1[illegible]	Pile length uniformly increases east to west and decreases south to north

NOTES

* Special treatment required around major existing buried structures.

** Pile lengths measured from water surface or existing ground surface.

*** Costs do not include steel pile points which may be required for penetrating obstructions or embedment in sloping rock surface. These estimated costs per pile are [illegible] for [illegible] pile; [illegible] for [illegible] pile

**** Pile driving operations on all land based alternates may be expected to encounter numerous utilities and obstructions.

***** Except as noted under "Remarks", all pile foundations extend to end bearing on Gray or Brown glacial till or ledge rock.

PREPARED BY

DRAWN BY

CHECKED BY B. E. Butler

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
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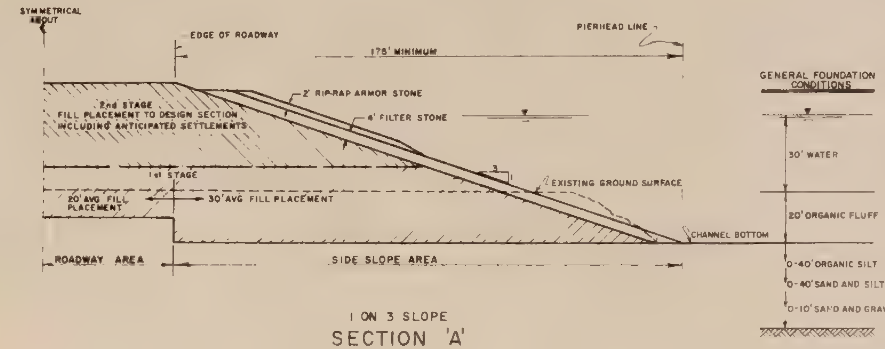
PIN 0024.11.111

PILE ANALYSIS SUMMARY

APPROVED 10/13 1972
[illegible signature]
DIRECTOR

DISTRICT NO. 10
COUNTY NEW YORK

DWG NO 10 SM 1841

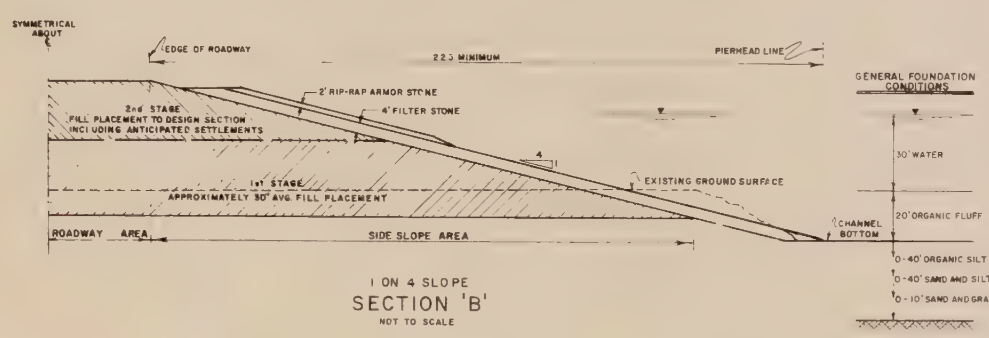


1 ON 3 SLOPE

SECTION 'A'

NOT TO SCALE

	Item	Estimated Limits	Unit Costs	Cost Estimate	Estimated Performance
				Per Station	
SIDE SLOPE AREA	Unclassified Excavation	20' Avg. Removal	$3.50/yd³-disposal @ sea	$\left[\frac{120+90}{2}(20)\right]\frac{100}{27}\times3.50=$ $41,300	
	Fill	Includes Anticipated 6' Avg. Settlement	$2.50/yd³	$\left[59\left(\frac{189}{2}\right)\right]\frac{100}{27}\times2.90=$ $60,400	
	Rip-Rap Armor Stone Filter Stone	Slope for Channel side only 60' along slope 100' along slope	[illegible]	$2\times60\times\frac{100}{27}\times45=$ $20,000 $4\times100\times\frac{100}{27}\times20=$ $33,400	
	SIDE SLOPE AREA			TOTAL WITH RIP-RAP $178,100 TOTAL WITHOUT RIP RAP $101,700	
				Per Station Per Foot of Roadway Width	
ROADWAY AREA	Unclassified Excavation	1.' Avg. Removal	$3.50/yd³-disposal @ sea	$1\times10\times\frac{100}{27}\times3.50=$ $130	
	Fill	Includes Anticipated 12' Avg. Settlement	[illegible]	$1\times65\times\frac{100}{27}\times2.50=$ $600	[illegible] Inches Post Const. Settlement
	Pavement	[illegible] Typical Section	[illegible]		
				ROADWAY AREA TOTAL $730	



1 ON 4 SLOPE

SECTION 'B'

NOT TO SCALE

	Item	Estimated Limits	Unit Costs	Cost Estimates	Estimated Performance
				Per Station	
SIDE SLOPE AREA	Unclassified Excavation	10' Avg. Removal	[illegible]-disposal @ sea	$\left[\frac{172+212}{2}(10)\right]\frac{100}{27}\times3.50=$ $24,900	
	Fill	Includes Anticipated 6' Avg. Settlement	[illegible] yd³	$\left[59\left(\frac{212}{2}\right)\right]\frac{100}{27}\times2.90=$ $58,000	
	Rip-Rap Armor Stone Filter Stone	Slope for Channel side only 80' along slope 200' along slope	[illegible] yd³ $20/yd³	$2\times80\times\frac{100}{27}\times45=$ $26,700 $4\times200\times\frac{100}{27}\times20=$ $59,[illegible]	
	SIDE SLOPE AREA			TOTAL WITH RIP-RAP $[illegible] TOTAL WITHOUT RIP RAP $82,900	
				Per Station Per Foot of Roadway Width	
ROADWAY AREA	Unclassified Excavation	[illegible] Avg. Removal	$3.50 yd³-disposal @ sea	$1\times10\times\frac{100}{27}\times3.50=$ $130	
	Fill	Includes Anticipated [illegible] Avg. Settlement	[illegible] yd³	$1\times65\times\frac{100}{27}\times2.50=$ $600	6-12 Inches Post Const. Settlement
	Pavement	[illegible] Typical Section	[illegible]		
				ROADWAY AREA TOTAL $730	

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111

PROPOSED EMBANKMENT SECTIONS

PREPARED BY: [illegible]
DRAWN BY [illegible]
CHECKED BY [illegible]

APPROVED [illegible] 19[illegible]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1838

would reduce the unit cost of unclassified excavation by $2.00 per cubic yard because disposal at sea of this material would not be required.

C. Depressed Roadway Design Study

Our study of depressed roadway foundation designs included three alternate methods of treatment: mass concrete slab and gravity walls, concrete slab and walls with pile tie-downs, and slurry trench walls. After analyzing these alternates we found that certain alternates could be effectively used in combination. A summary of the results of our analyses and accompanying cost estimates are shown on Drawing No. 10 SM 1843. This information and the following discussion provides the basis for comparing design alternates and preparing preliminary depressed roadway foundation designs.

Mass concrete slab and gravity walls appeared to be best suited for only shallow installations not requiring dewatering. Deeper installations would require extensive temporary sheeting and dewatering procedures besides requiring added mass to resist anticipated hydrostatic uplift pressures.

Concrete walls with a connecting roadway slab utilizing pile tie-downs incorporating anchors embedded into rock may be used to resist large uplift pressures. This system would be installed by driving sheet piling at the lateral limits of the depressed section to a prescribed depth below excavation level. The soil within the sheeting rows would then be excavated with the ground water maintained at original level to prevent bottom blow-out. When the excavation is completed to the prescribed depth, an adequate number of piles would be driven underwater to ledge rock. Rock anchors would be installed in piles bearing in rock to resist anticipated uplift pressures. Then a concrete slab would be tremied around the piles and allowed to set before dewatering and constructing the permanent concrete walls while using the existing sheeting as the back form. Interior bracing would be installed as governed by the sequence of construction. For pile lengths in excess of 100 feet, a mass concrete tremie slab would be more economical than the aforementioned tie-down system. Although the tie-down method is feasible, it is fraught with construction problems and does not appear to provide the economic benefits inherent in the slurry trench wall method.

The "slurry" method provides a permanent water-tight installation when the walls can be economically keyed into ledge rock. The major economy effected is the elimination of the temporary sheet piling which would be required in either of the above mentioned methods. Historically, the major difficulty in deep foundation construction in New York City has been the installation and safe maintenance of temporary sheet piling. If an adequate key into rock can be achieved for the slurry wall, the soil may be removed to design level with only a minimum of dewatering required. Construction may then proceed in the dry, provided an underdrain system is installed to remove the relatively small quantity of water expected from seepage. This construction technique was used with great success at the World Trade Center which is located within close proximity to the proposed West Side Highway Project. In addition, sand drains could be provided to locally relieve any excessive hydrostatic pressure caused by leakage through either the seal or badly fractured rock along the bottom.

If the rock surface is not within an economic depth, the slurry method may be used in combination with either the mass concrete method or tie-down method to permit dewatering and roadway construction in the dry. This combination system is detailed on Drawing No. 10 SM 1843.

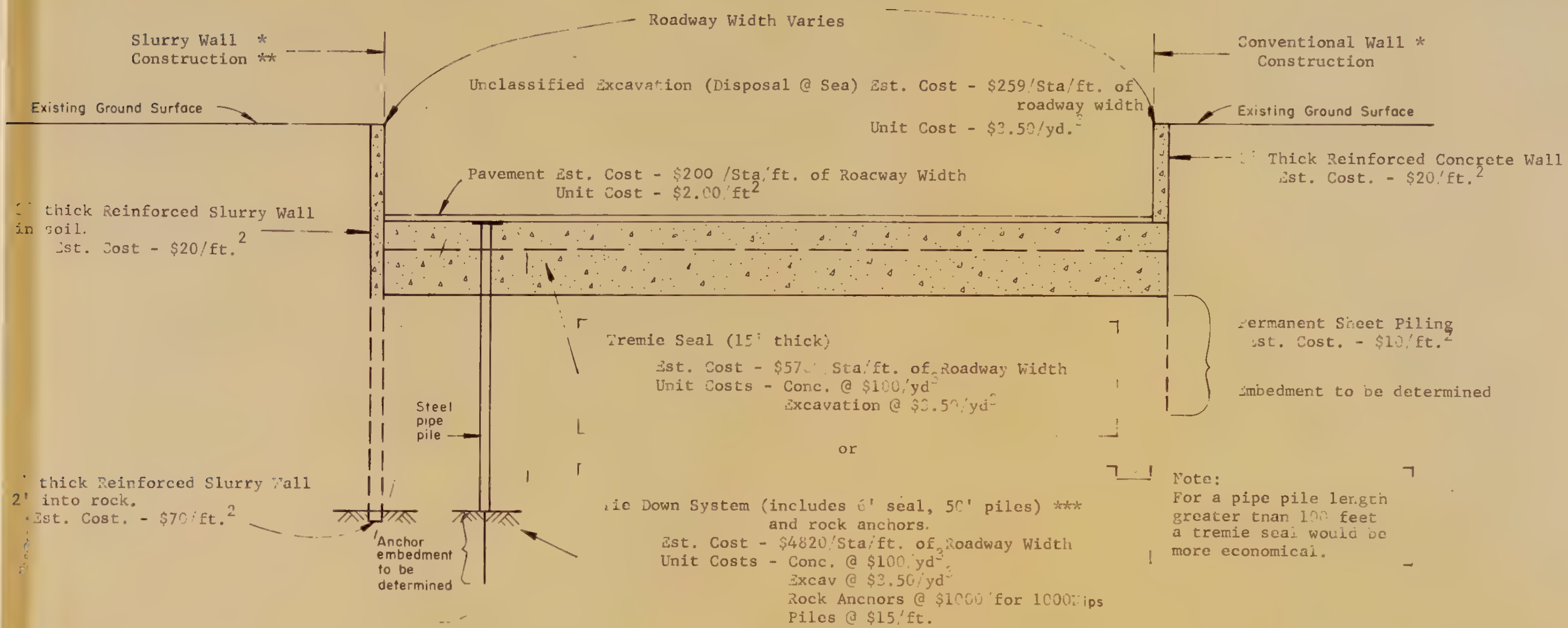
Depressed roadway sections which straddle or adjoin the existing bulkhead will require special treatment. Initially an embankment would have to be constructed adjacent to the existing bulkhead in accordance with Drawing No. 10 SM 18[illegible]. The end limit of the embankment surface would be extended at grade for a distance of approximately 20 feet beyond the outboard face of the slurry wall. This added width of embankment is required for the "slurry" equipment. Construction of a "slurry" wall could then proceed as outlined above.

FUTURE FOUNDATION INVESTIGATION AND DESIGN STUDIES

We have confined the feasibility study presented herein to the corridor bounded on the east by the existing West Side Highway and on the west by the pierhead line. More extensive alignment and interchange studies would only delay the submission of this report. At the present time, however, several additional borings have been completed by the Region 10 Soils Section in areas proposed for interchanges. In addition, a program of field permeability testing has been initiated to enable determination of dewatering criteria for depressed sections located on land. These permeability tests will be performed in both soil and rock deposits. The results from these additional explorations and tests will be made available when completed.

It is anticipated that certain alternate alignments will be selected for presentation at a public hearing. We will be available to provide additional input, as required to be used in the evaluations of these alternates. Upon their selection additional foundation design work may be required to refine the estimates contained in this report. However, we would not anticipate any problems in providing additional preliminary design information within the time remaining before the public hearing.

SUMMARY OF PRELIMINARY FOUNDATION DESIGN CRITERIA
DEPRESSED ROADWAY TREATMENT



1. Cost estimates do not include pumping costs for temporary dewatering or bracing system if necessary.
2. Cost estimates do not include facial treatment of walls.
3. Rock anchors may not be required where piles can develop uplift resistance in friction.

PREPARED BY
DRAWN BY
CHECKED BY

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
BUREAU OF SOIL MECHANICS

INTERSTATE ROUTE CONNECTION 516
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42ND STREET, BOROUGH OF MANHATTAN
PIN 0024 II III
DEPRESSED ROADWAY TREATMENT
SUMMARY

APPROVED 10/13 1972
DIRECTOR

DISTRICT NO. 10
COUNTY NEW YORK
DWG NO 10 SM 1843

A comprehensive subsurface explorations program in conjunction with an extensive laboratory and field testing program and an in-depth foundation design analysis will be required for final design of this project after the public hearing stage. This Bureau is prepared to undertake all of these tasks upon receipt of formal authorization to proceed.

APPENDIX

1. SOURCES OF SUBSURFACE INFORMATION

The following is the listing of all sources of subsurface information used for the preparation of drawings numbered 1 S 1 through SM 1836. This information was acquired through this Department's Deputy Project Manager for the West Side Expressway Project. The prefix on the boring number refers to the particular source as follows:

Prefix	Source
A	Penn Central R.R. (Hudson Tubes)
B-1	Port Authority (George Washington Bridge)
B-2	Port Authority (Heliport @ 30th St.)
B-	Port Authority (World Trade Center)
B-4	Port Authority (Holland Tunnel)
B-5	Port Authority (Land Fill @ World Trade)
B-	Port Authority (Lincoln Tunnel)
B-7	Port Authority (Ocean Liner Terminal)
C-1	New York City Dept. of Public Works North River Water Pollution Control Project South Branch Sewer Contract 1 Bank St. to 5'th St.
C-2	Same as above-contract 2A 5'th St. to St. Clair PL
C-	Same as above-contract 2B St. Clair PL. to Port Forebay
C-4	Same as above-contract 1.2nd St. to 214 St.
D-	New York City Dept. of Public Works Borough of Manhattan, Newtown Creek P.C.P. South Branch Interceptor West Side, Clarkson St. to Battery Park
E-	New York City Dept. of Marine and Aviation New Pier 94 - North River Warren George - Boring Contractor
G-	New York City Dept. of Marine and Aviation Proposed Pier 4 - North River Holland America Lines, Roberts and Shaefer Consulting Engr., Warren George Boring Contractor
H-	New York City Dept. of Marine and Aviation New Piers 72-74-76 - North River Raymond International
J-	New York City - Dept. of Marine and Aviation Test Boring for Economic and Physical Survey and Study North River Waterfront Area Kennedy and Riegger Drilling Co., Inc.
K-	New York City Dept. of Marine and Aviation New Pier 57 - North Rive Madigan Hyland Engrs.
L-	Battery Park City Authority Pier 14 - Pier 18 Mueser, Rutledge, Wentworth and Johnston Consulting Engineers
M-	New York State Dept. of Public Works Miller Highway - 1960's 57th St. to 72nd St. Hardesty and Hanover Consulting Engineers
N-	Index of Borings, Transportation Administration, Battery Park to 72nd St., New York City
P-	New York State Dept. of Transportation Miller Expressway 1972

2. DATUM NOTE

Elevation 300.00 has been arbitrarily established for this presentation as being equivalent to elevation 2.750 above mean sea level at Sandy Hook.

3. WATER LEVEL NOTES

a. The elevation of the river surface is arbitrarily shown at elevation 300 on the subsurface profiles for presentation purposes only.

b. Groundwater levels have not been indicated on the profiles for the Plan 'B' alignment since recorded water levels in the borings fluctuated over a wide range of depths. This is believed due to tidal variations.

4. SCALE NOTE

The scale of the Boring Location Plans are approximately 1" = 1 before reduction. Any measurement to borings requiring accuracy within 2 percent should be referred to the original documents from which the borings were taken.

GENERAL CORRIDOR

Study Location

Battery Park to 42 nd St.

SCALE 1:24,000

PREPARED BY

DRAWN BY

CHECKED BY

LEGEND

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Color

Br - Brown
Gr - Gray
Bk - Black
Rd - Red

Amount of Component Material

Primary Component Capitalized
"and" 50% to 60% of secondary component
"some" 40% to 10% " "
"trace" 10% to less " "

SYMBOLS

BORING LOCATION

WATER LEVEL

INTERPOLATED SOIL OR ROCK BOUNDARY

Soil Description

ASSUMED SOIL OR ROCK BOUNDARY

Soil Description

LEDGE ROCK

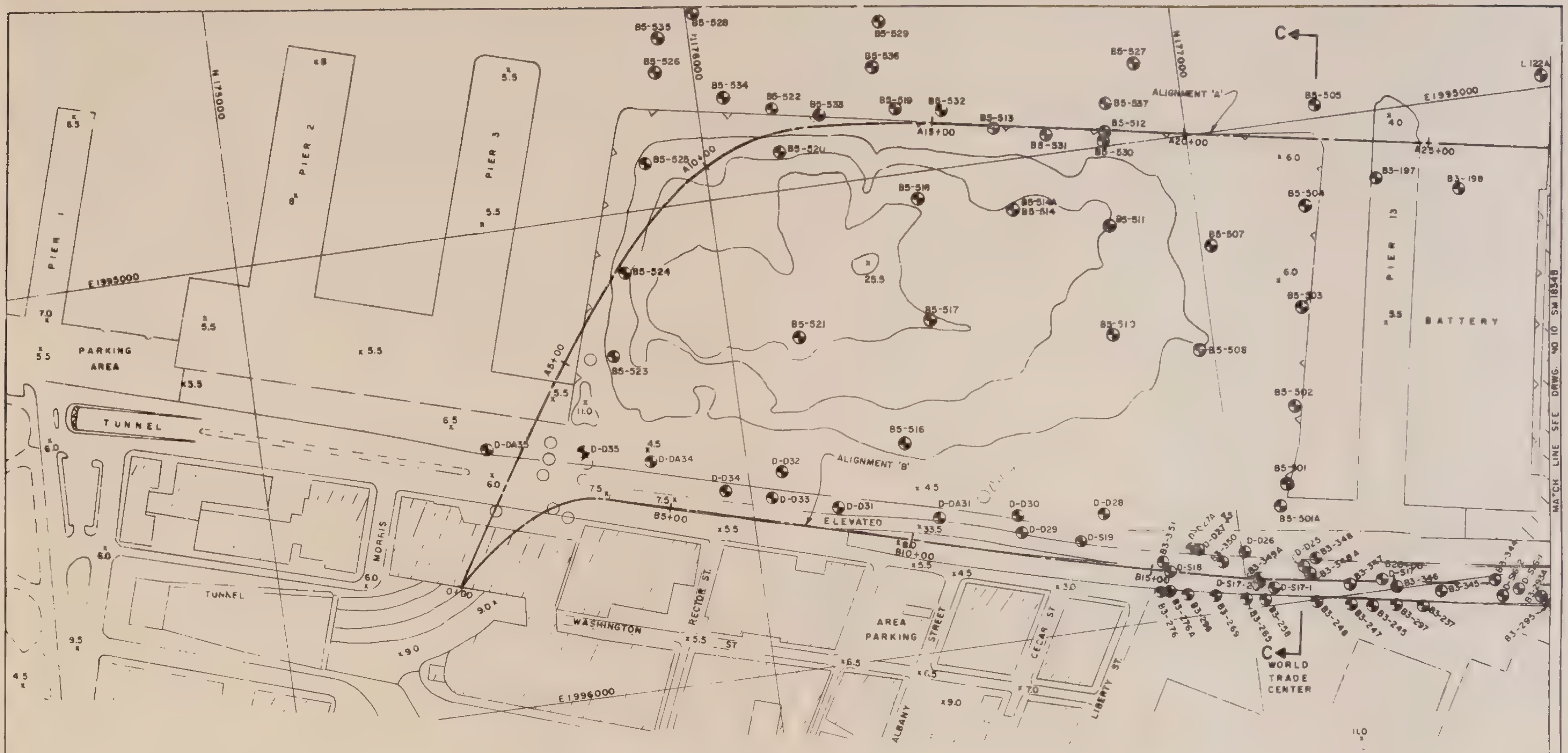
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN C024 11 111

GENERAL NOTES

APPROVED 19 72
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834



PLAN

APPROX. SCALE: 1" = 100'

See Drawing No. 10SM 1834 for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

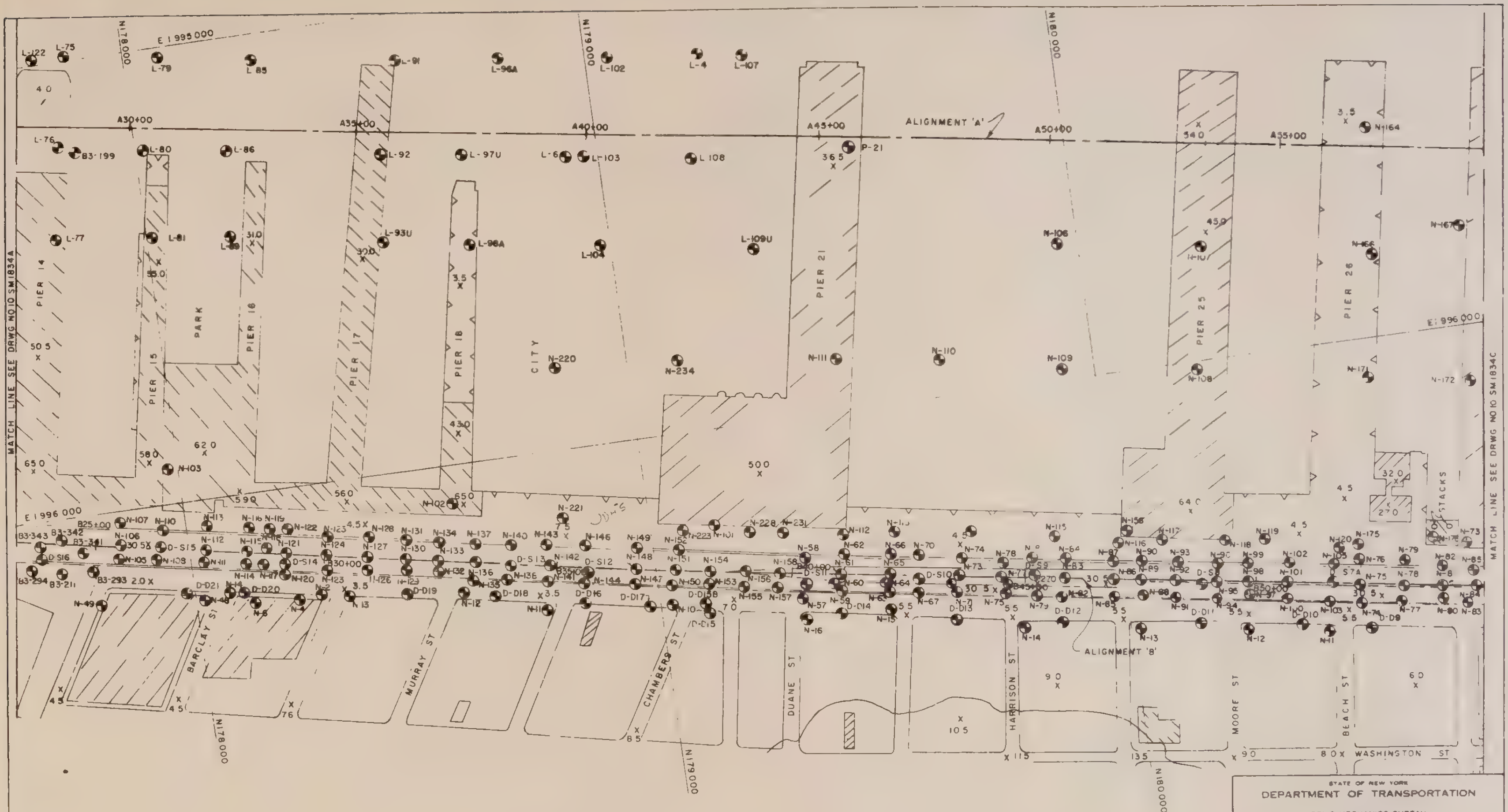
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0241.11

BORING LOCATION PLAN

PREPARED BY
DRAWN BY
CHECKED BY R.S. Cheney

APPROVED OCT. 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 A



PLAN

APPROX SCALE 1" = 100'

See Drawing No. 10SM ... for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

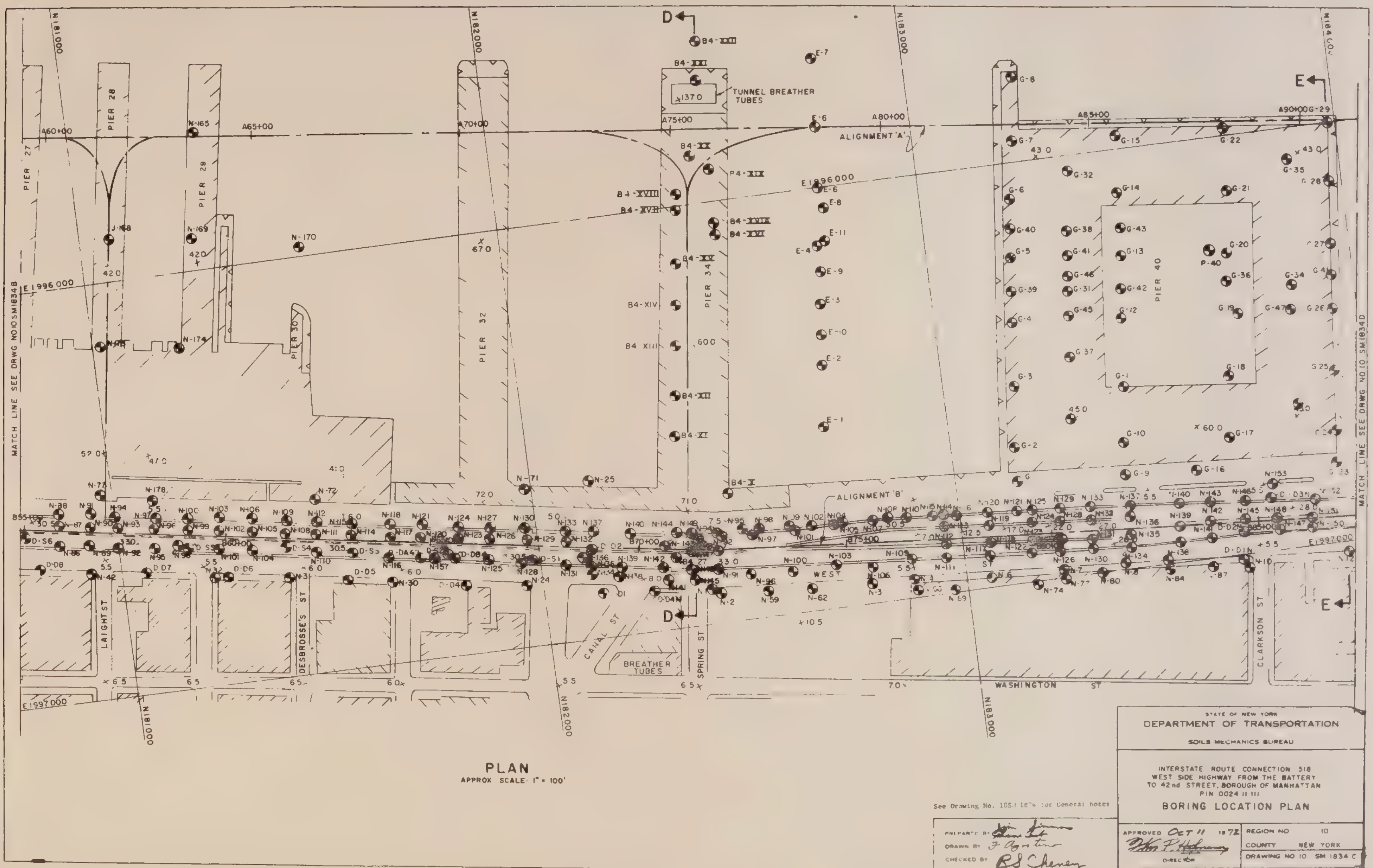
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN

BORING LOCATION PLAN

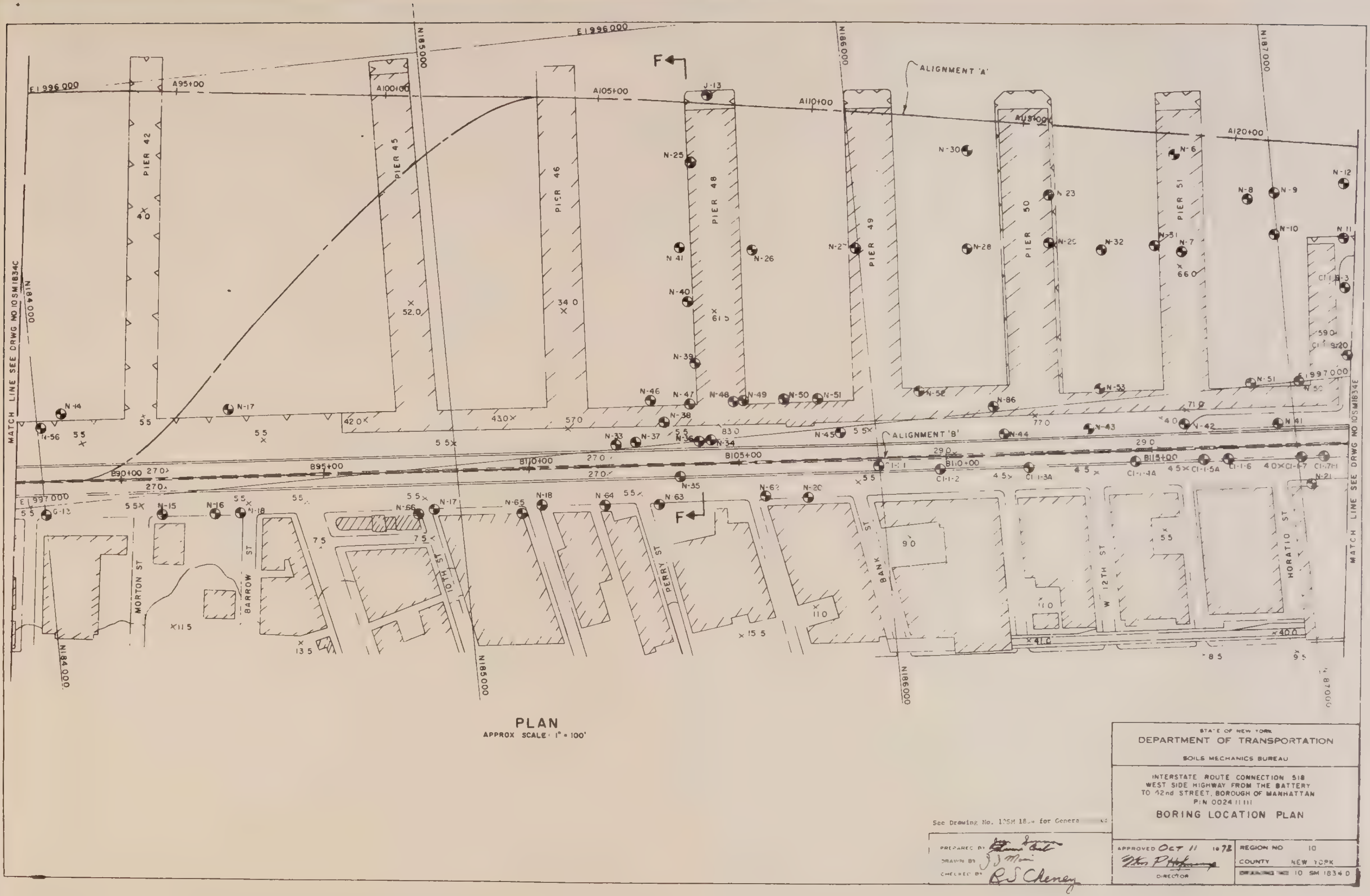
PREPARED BY
DRAWN BY N. Pulcini
CHECKED BY R. L. Cheney

APPROVED Oct. 11 1972
DIRECTOR

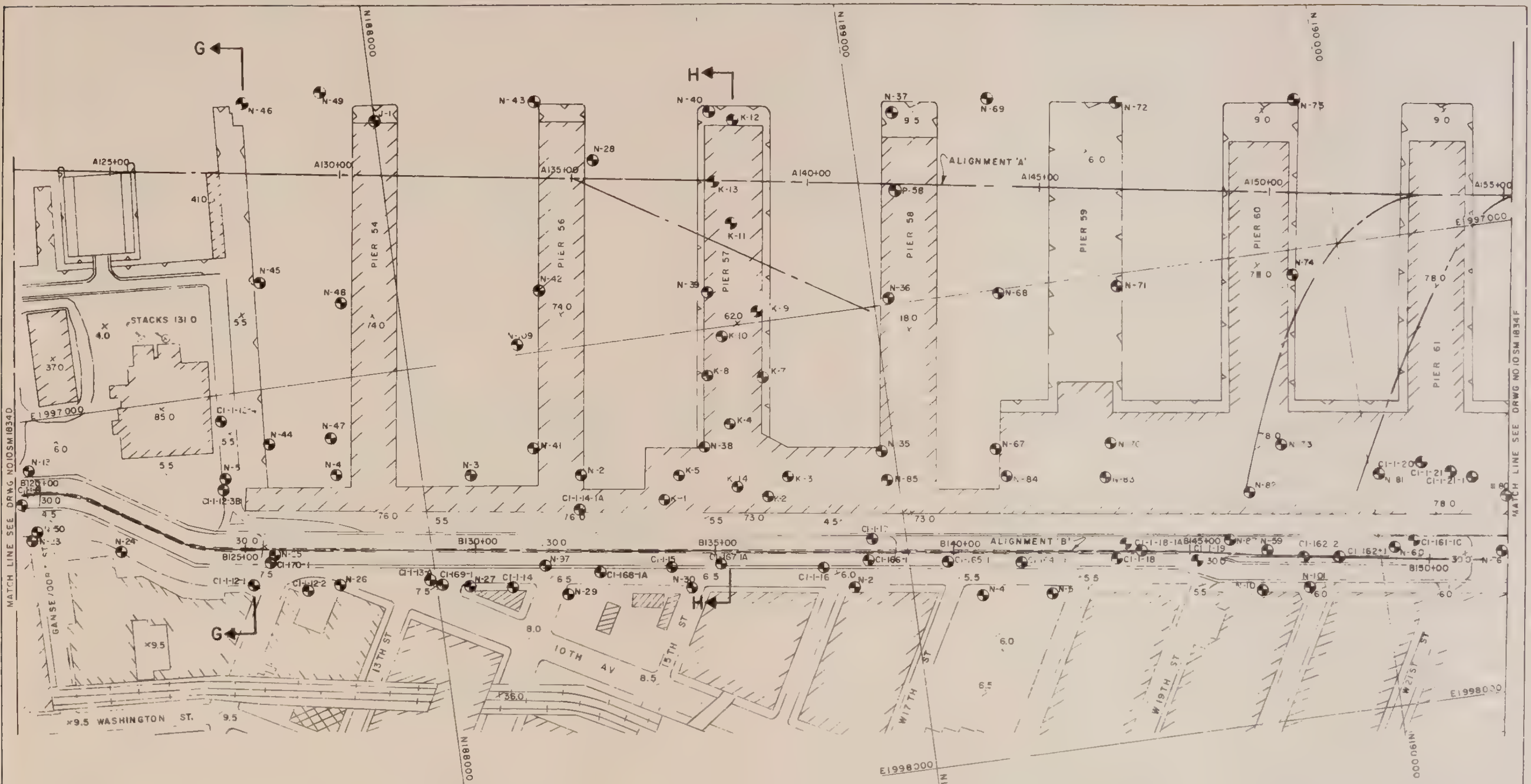
REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 834 B



PLAN
APPROX SCALE 1" = 100'
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111
BORING LOCATION PLAN
See Drawing No. 10S 1834 for General Notes
PREPARED BY
DRAWN BY
CHECKED BY
APPROVED OCT 11 1972
DIRECTOR
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 C
MATCH LINE SEE DRWG NO 10 SM 1834 B
MATCH LINE SEE DRWG NO 10 SM 1834 D
PIER 27
PIER 28
PIER 29
PIER 30
PIER 32
PIER 34
PIER 40
TUNNEL BREATHER TUBES
BREATHER TUBES
ALIGNMENT 'A'
ALIGNMENT 'B'
WEST
WASHINGTON ST
LAIGHT ST
DESBROSSE'S ST
CANAL ST
SPRING ST
CLARKSON ST



PIER 42
PIER 45
PIER 46
PIER 48
PIER 49
PIER 50
PIER 51
ALIGNMENT 'A'
ALIGNMENT 'B'
MORTON ST
BARROW ST
10TH ST
PERRY ST
BANK ST
W 12TH ST
HORATIO ST
MATCH LINE SEE DRWG NO 10SM1834C
MATCH LINE SEE DRWG NO 10SM1834E
PLAN
APPROX SCALE: 1" = 100'
See Drawing No. 10SM 18.. for Genera
PREPARED BY
DRAWN BY
CHECKED BY
R S Cheney
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111
BORING LOCATION PLAN
APPROVED Oct 11 1972
DIRECTOR
REGION NO 10
COUNTY NEW YORK
10 SM 1834 0



PLAN

APPROX SCALE: 1" = 100'

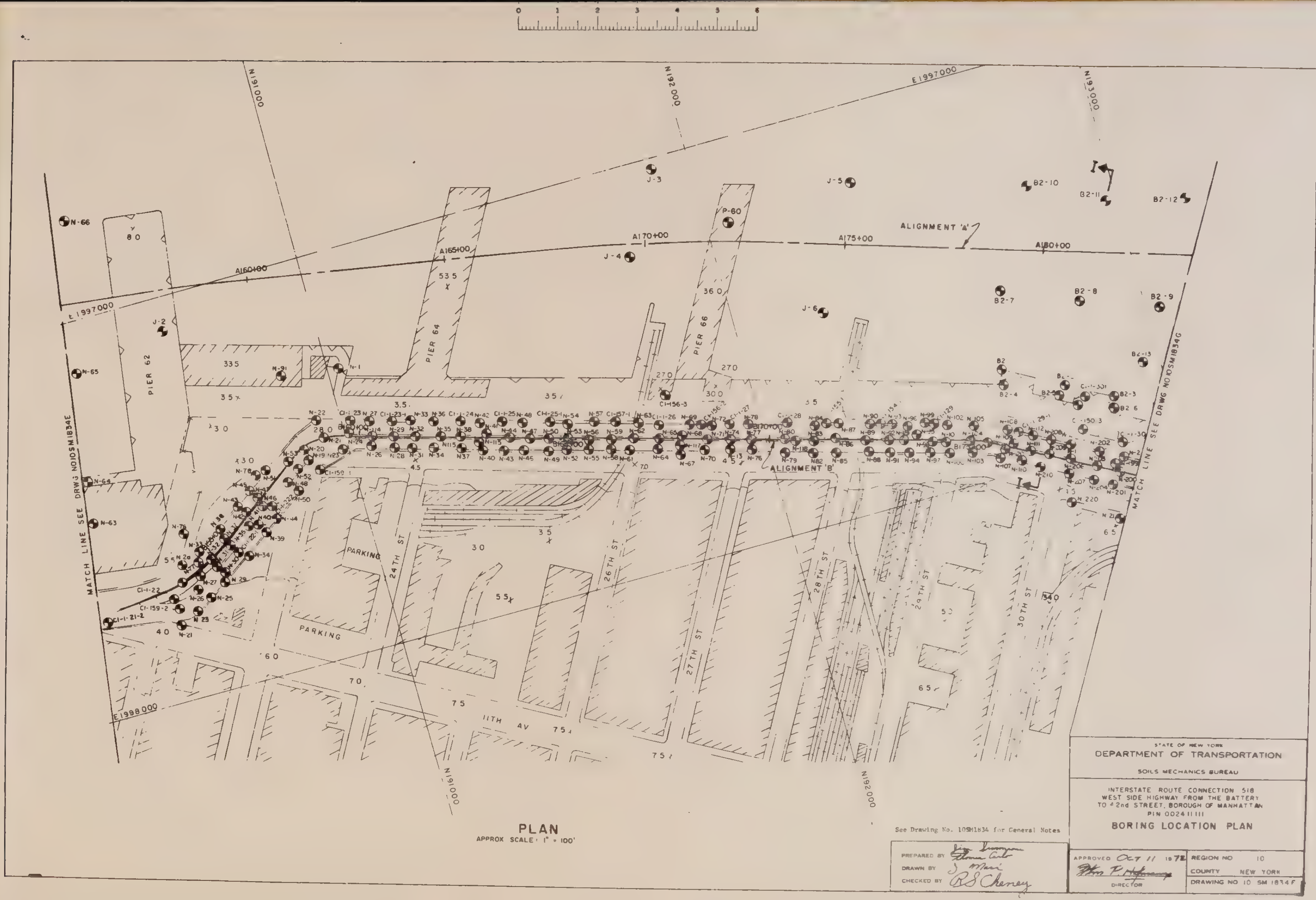
See Drawing No. 10SM 1834 for General Notes

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

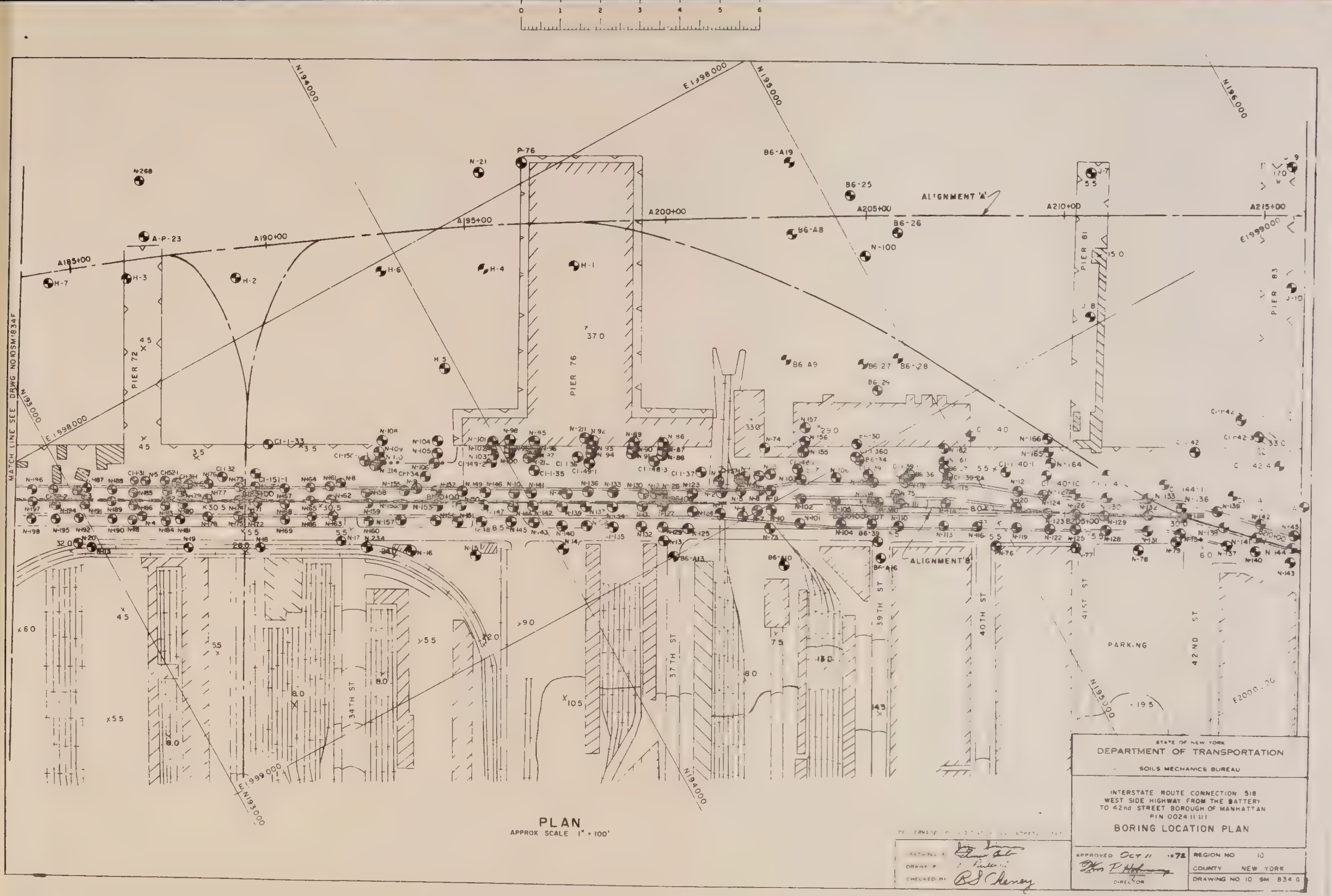
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

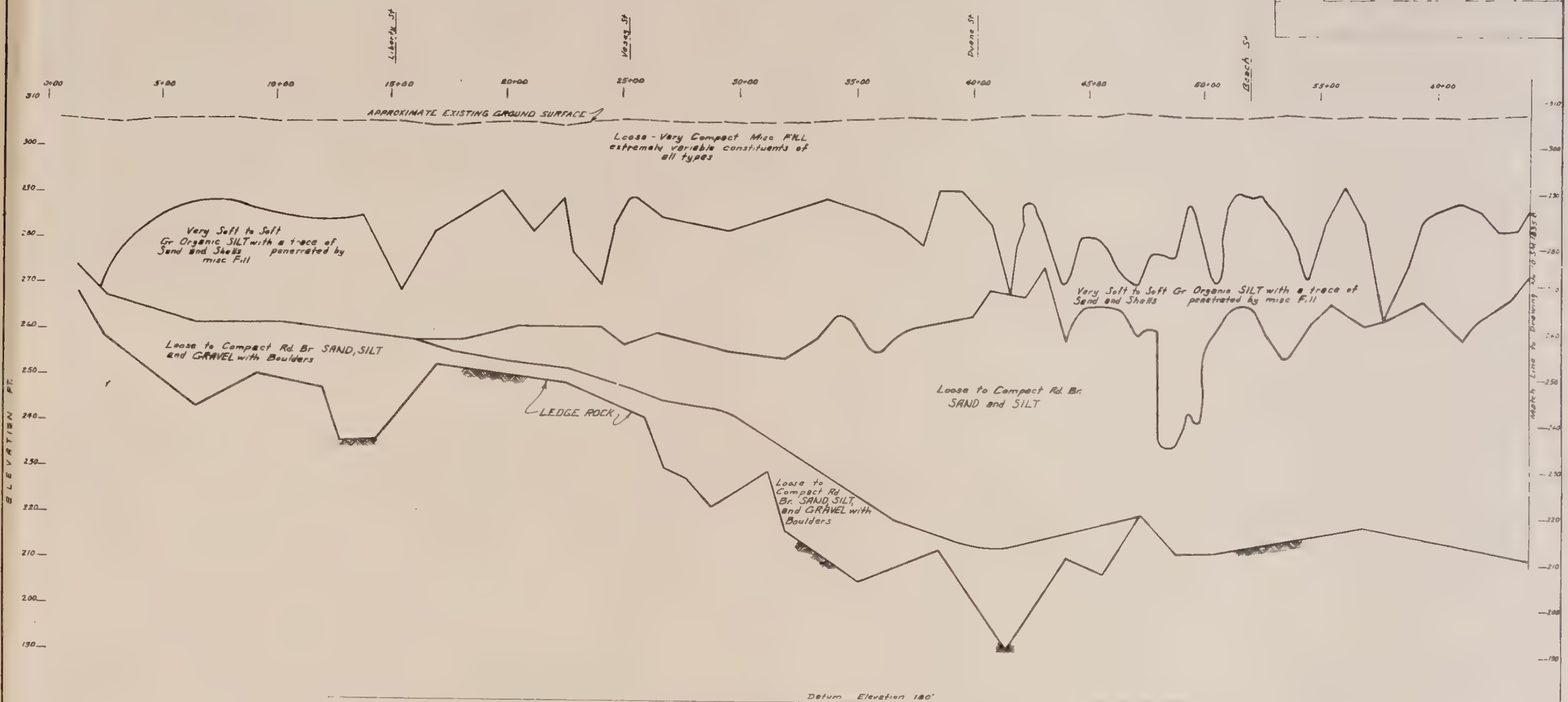
BORING LOCATION PLAN

PREPARED BY	
DRAWN BY	
CHECKED BY	R.S. Cheney
APPROVED	Oct 11 1972
	Wm. P. Hofmann, DIRECTOR
REGION NO	10
COUNTY	NEW YORK
DRAWING NO	10 SM 1834 E



ALIGNMENT 'A'
ALIGNMENT 'B'
PIER 62
PIER 64
PIER 66
24TH ST
26TH ST
27TH ST
28TH ST
29TH ST
30TH ST
11TH AV
PARKING
MATCH LINE SEE DRWG NO10SM1834E
MATCH LINE SEE DRWG NO10SM1834G
A160+00
A165+00
A170+00
A175+00
A180+00
E1997000
E1998000
N191000
N192000
N193000
PLAN
APPROX SCALE: 1" = 100'
See Drawing No. 10SM1834 for General Notes
PREPARED BY
DRAWN BY
CHECKED BY
R.S. Cheney
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111
BORING LOCATION PLAN
APPROVED OCT 11 1972
DIRECTOR
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1834 F


STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024.11.11
BORING LOCATION PLAN
APPROVED OCT 11 1972
DIRECTOR
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 834 G
CHECKED BY
PLAN
APPROX SCALE 1" = 100'
MATCH LINE SEE DRWG NO 10SM 834F
ALIGNMENT 'A'
ALIGNMENT 'B'
PIER 72
PIER 76
PIER 81
PIER 83
34TH ST
37TH ST
39TH ST
40TH ST
41ST ST
42ND ST
PARKING



PROFILE PLAN 'B' from BATTERY TUNNEL to WATTS ST. ('B' Sta. 0+00 to 'B' Sta. 64+00)

SCALE. HORIZ. 1" = 200'
VERT 1" = 10'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons, Steve Cohr
DRAWN BY M. Pulsen
CHECKED BY R. J. Cherey

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " "
"trace"	10% to less " "

Color
BR - Brown
Gr - Gray
Bk - Black
Rd - Red

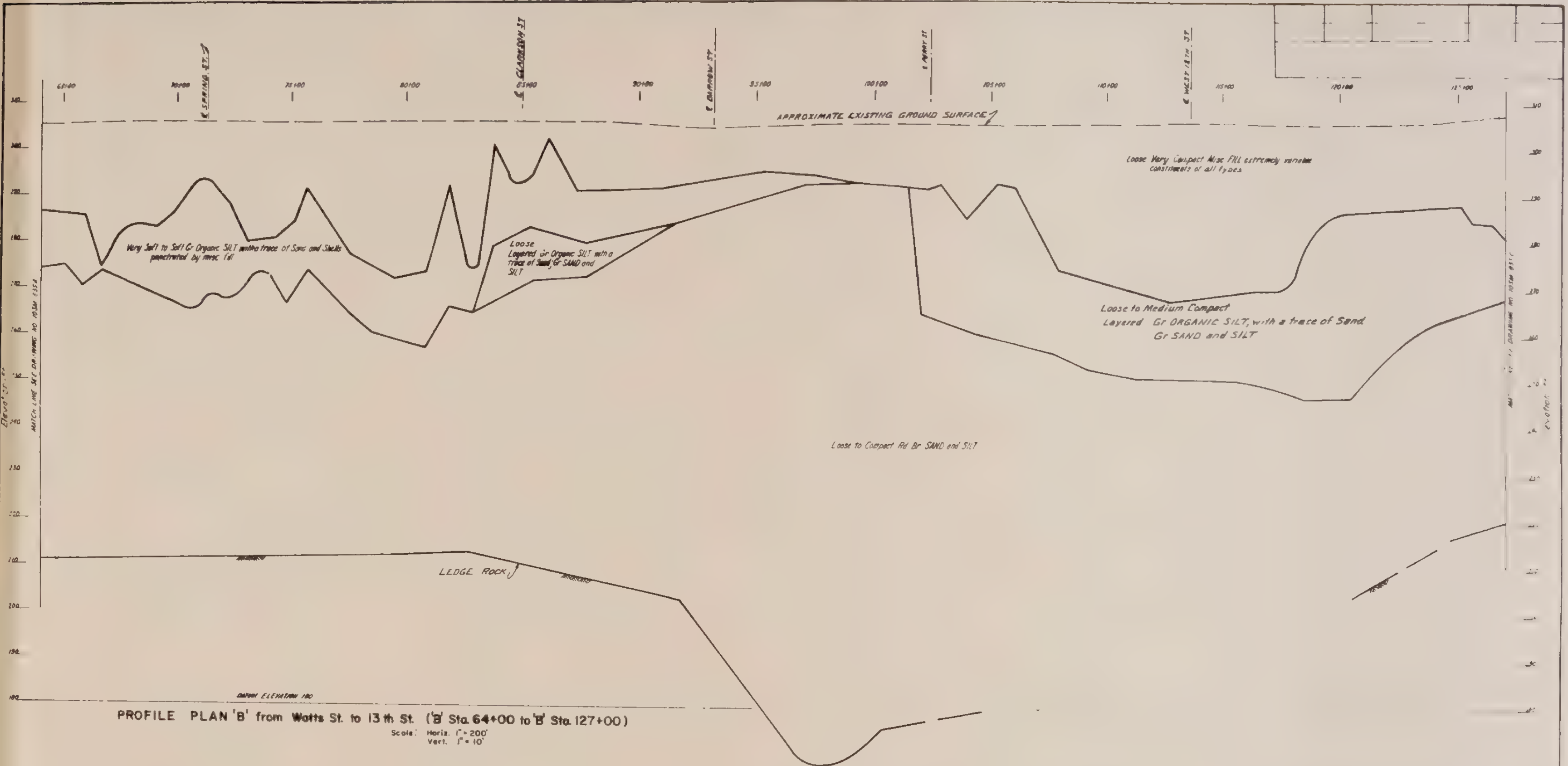
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 (1)

GENERAL SUBSURFACE PROFILE
ALONG EXISTING ALIGNMENT

APPROVED Oct 11 1978
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 A



PROFILE PLAN 'B' from Watts St. to 13 th St. ('B' Sta. 64+00 to 'B' Sta. 127+00)

Scale: Horiz. 1" = 200'
Vert. 1" = 10'

See Drawing No. 10 SM ...

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons
DRAWN BY D. Jones
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material

Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

BR - Brown
Gr - Grey
Bk - Black
Rd - Red

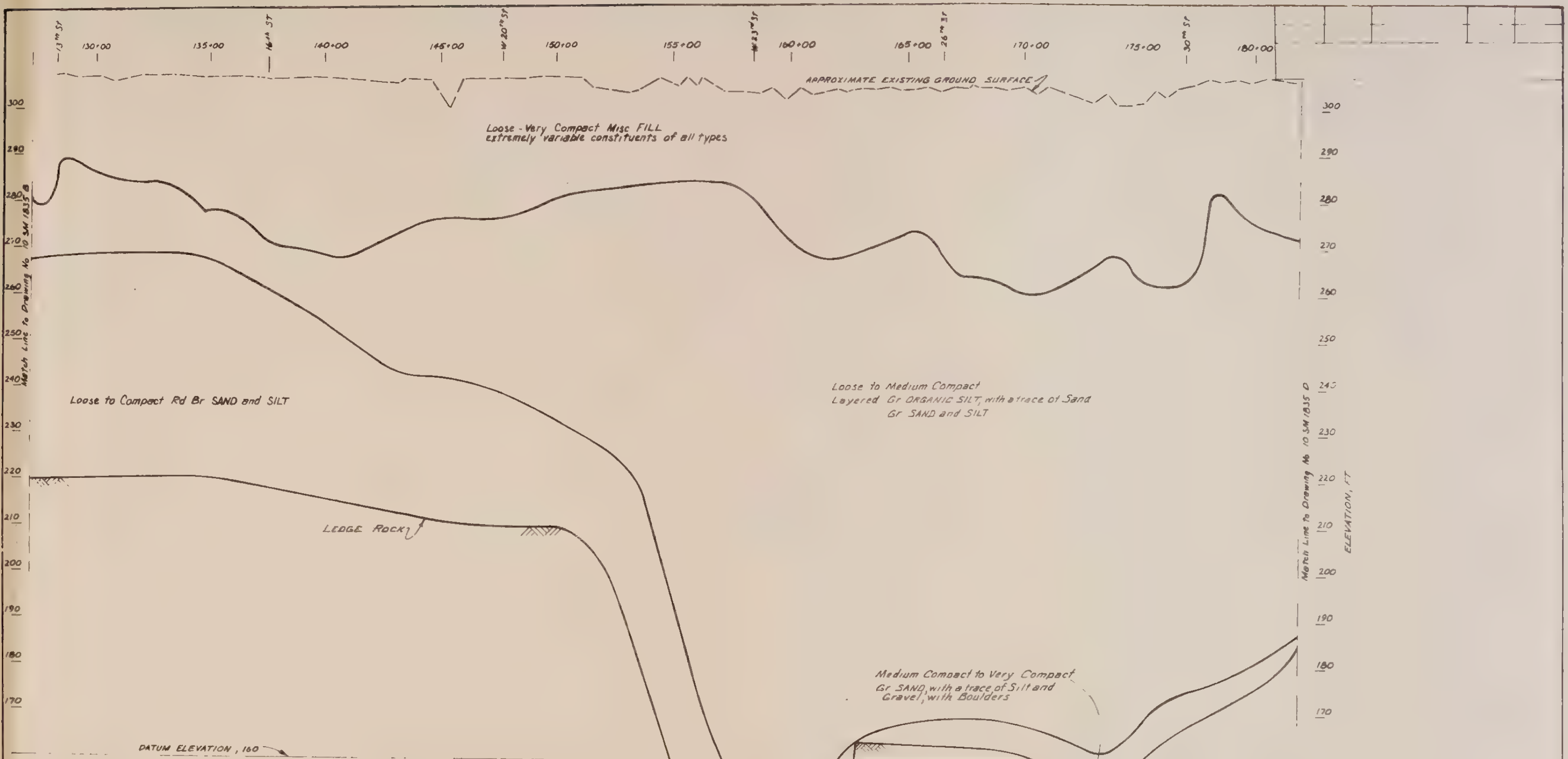
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
ALONG EXISTING ALIGNMENT

APPROVED Oct. 1. 1972
Wm. P. Hoffman
DIRECTOR

REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 18358



PROFILE PLAN 'B' from 13th St. to PIER #72 ('B' Sta. 127+00 to 'B' Sta. 182+00)

Scale: Horiz. 1" = 200'
Vert. 1" = 10'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simons / [signature]
DRAWN BY F. Ogorton
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

BR - Brown
Gr - Gray
Bk - Black
Rd - Red

See Drawing No. 10SM 1834 for General Note

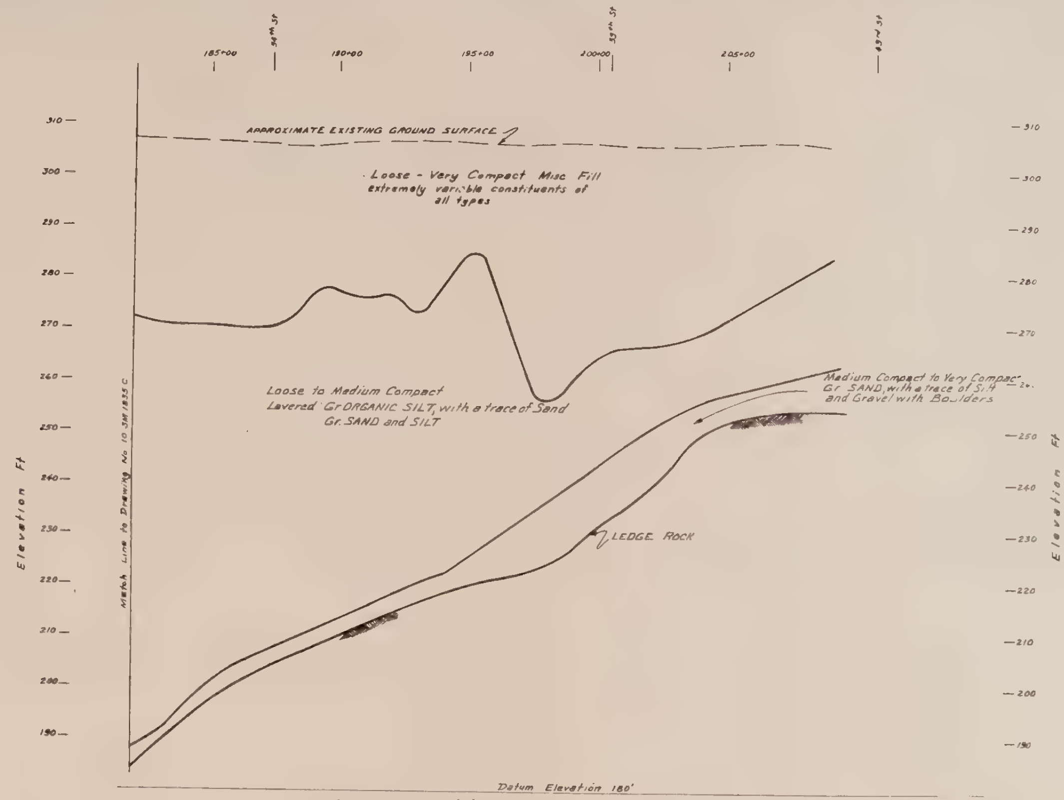
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
ALONG EXISTING ALIGNMENT

APPROVED Oct 11 1974
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 C



PROFILE PLAN 'B' from Pier NO. 72 to 42 nd St. ('B' Sta. 182+00 to 'B' Sta. 210+00)

Scale Horiz 1" = 200'
Vert 1" = 10'

See Drawing No. 10 SM 1834 for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signatures]
DRAWN BY [signature]
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg No. of Blows per foot for 18 in drop of 300 lb hammer 2 In. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " "
"trace"	10% to less " " "

Color	
BR	Brown
Gr	Gray
Bl	Black
Rd	Red

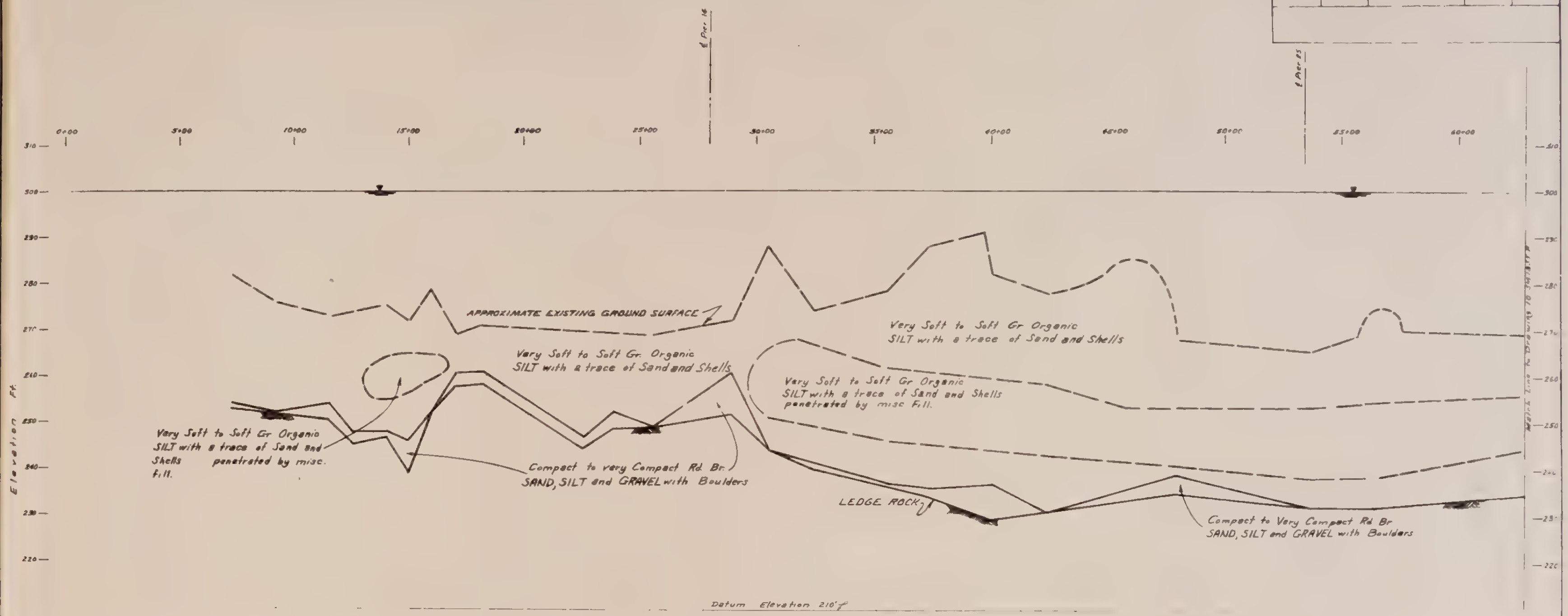
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE ALONG EXISTING ALIGNMENT

APPROVED Oct 1 1973
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM [illegible]



PROFILE PLAN 'A' EAST OF PIERHEAD LINE from BATTERY TUNNEL TO PIER 28 ('A' STA. 0+00 TO 'A' STA. 63+00)

Scale Horiz 1" = 200'
Vert 1" = 10'

See Drawing No. 10SM 18.- for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signature]
DRAWN BY M. Palmi
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color
BR - Brown
Gr - Gray
Bk - Black
Rd - Red

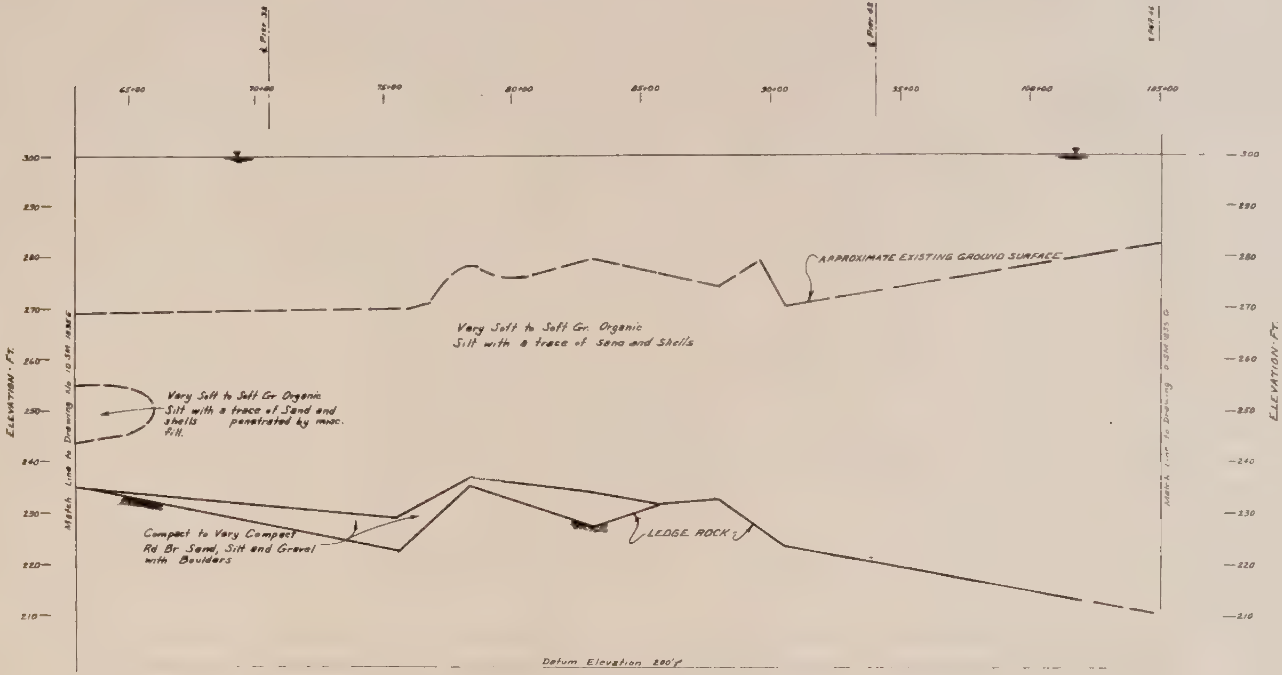
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct. 11 1972
[signature]
DIRECTOR

REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 1835 E



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 28 TO PIER 46 (℄ STA. 63+00 TO ℄ STA. 105+00)

Scale Horiz 1" = 200'
Vert 1" = 10'

See Drawing No. 10SM 18 4 for general notes

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY [signatures]
DRAWN BY [signature]
CHECKED BY R J Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material

Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

Br	Brown
Gr	Grey
Bk	Black
Rd	Red

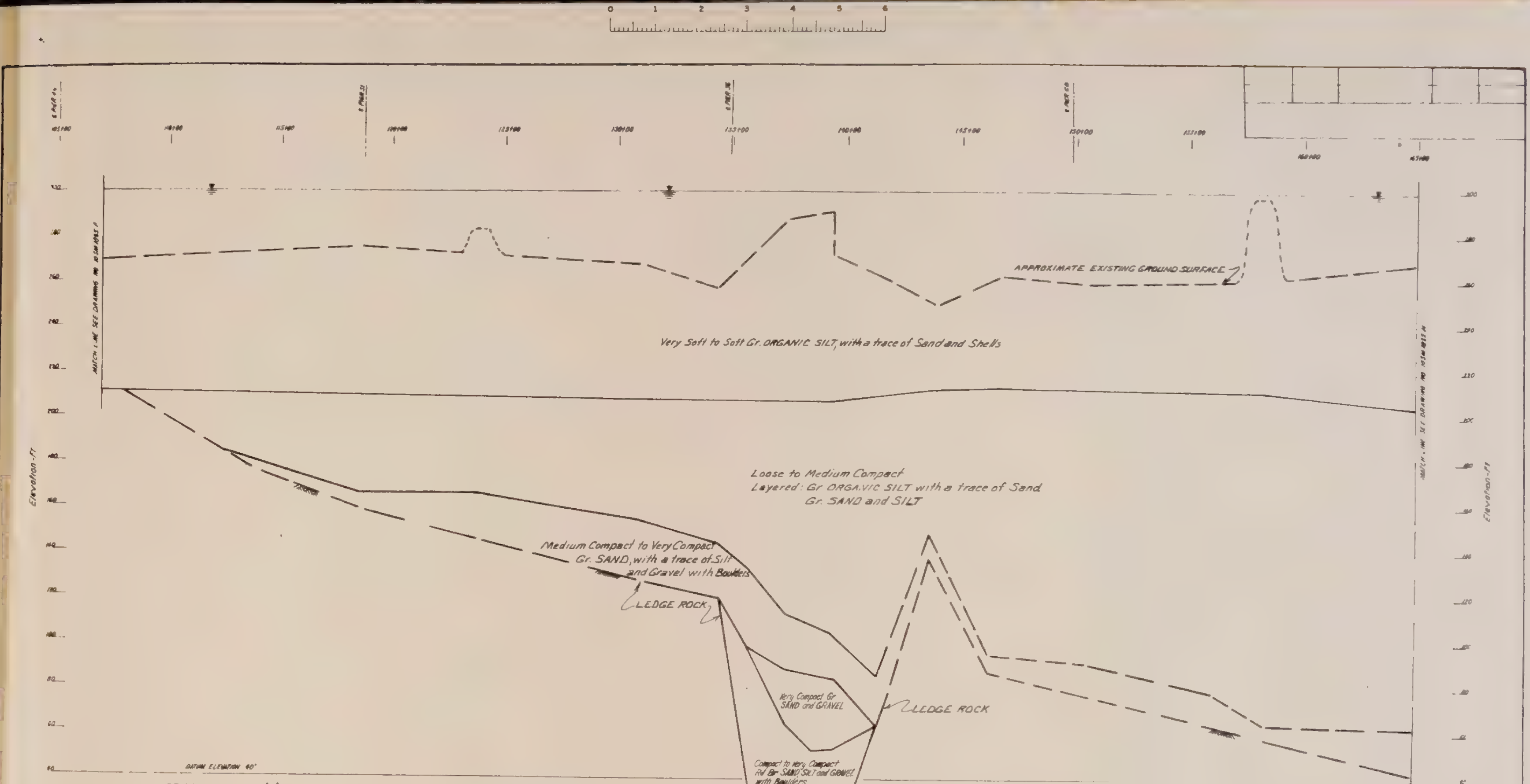
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
P N 0024 11 111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct 11 1972
[signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM [illegible]



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 46 TO PIER 64 ('A' STA. 105+00 TO 'A' STA. 165+00)

Scale Horiz. 1" = 200'
Vert. 1" = 20'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons
DRAWN BY D. Jones
CHECKED BY R.S. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

BR - Brown
Gr - Gray
Bk - Black
Rd - Red

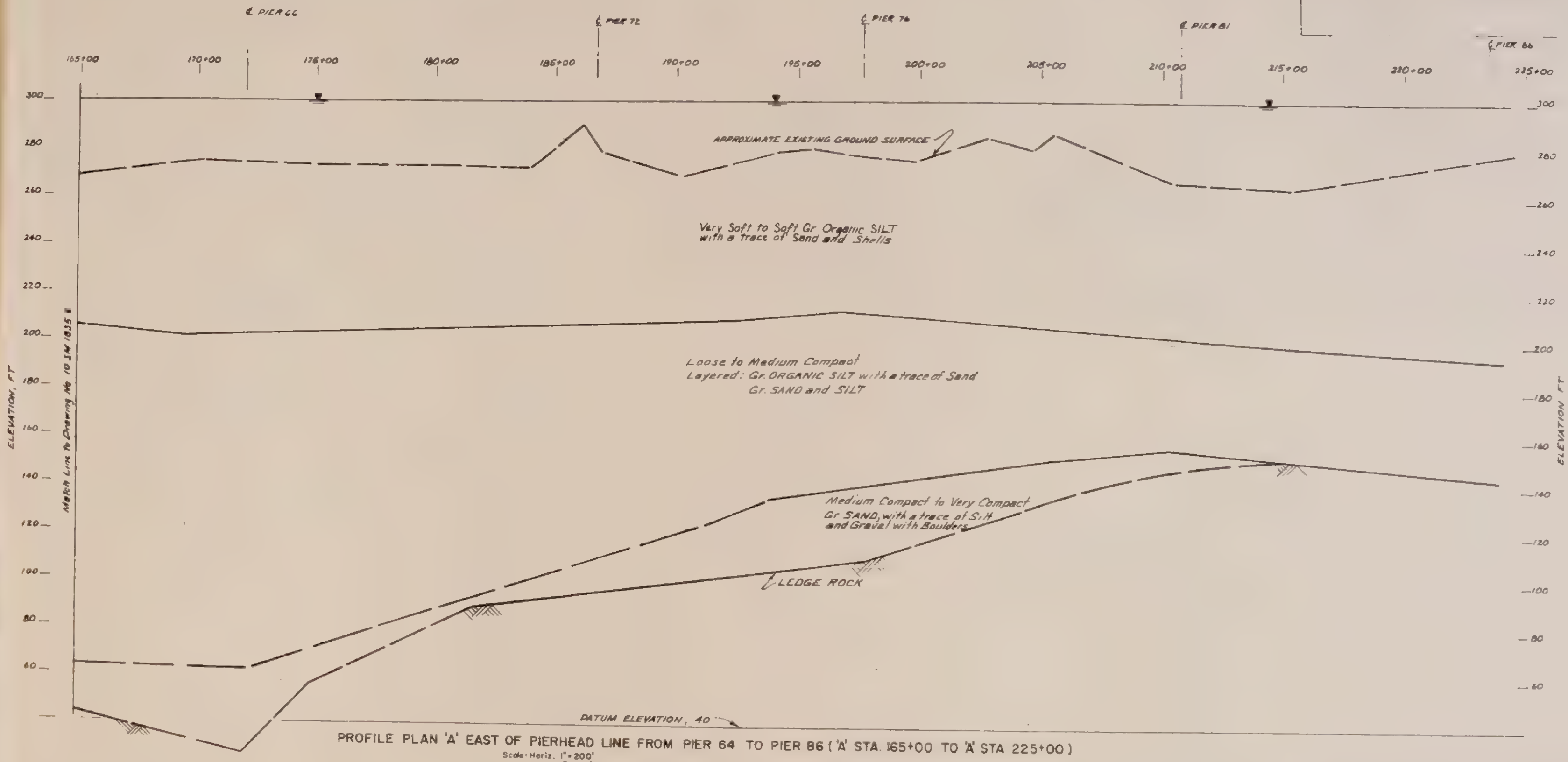
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE
EAST OF PIERHEAD LINE

APPROVED Oct 11 1974
Wm. P. Hofmann
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1356



PROFILE PLAN 'A' EAST OF PIERHEAD LINE FROM PIER 64 TO PIER 86 ('A' STA. 165+00 TO 'A' STA 225+00)

Scale: Horiz. 1" = 200'
Vert 1" = 20'

See Drawing No 10SH 1834 for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SH 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2. The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons / [illegible]
DRAWN BY F. Agostino
CHECKED BY R. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% "
"trace"	10% to less "

Color	
BR	Brown
Gr	Gray
Bk	Black
Rd	Red

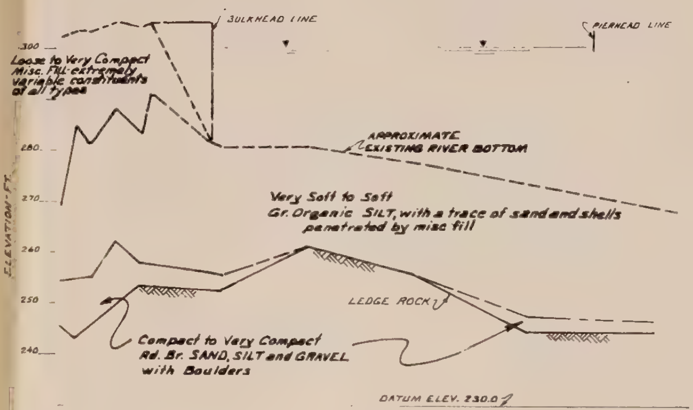
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE PROFILE EAST OF PIERHEAD LINE

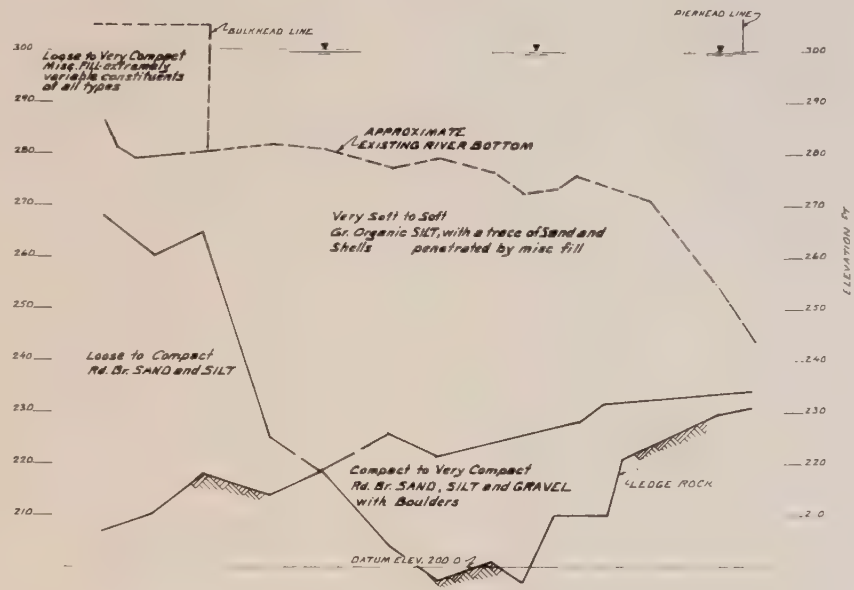
APPROVED OCT 1 1972
[signature]
DIRECTOR

REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 835 H



SECTION C-C

SCALE. HORIZONTAL. 1" = 100'
VERTICAL. 1" = 10'



SECTION D-D

SCALE HORIZONTAL 1" = 100'
VERTICAL 1" = 10'

See Drawing No. [illegible] for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons / [illegible]
DRAWN BY J J Masi
CHECKED BY R S Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " "
"trace"	10% to less " "

Color

- BR - Brown
- Gr - Gray
- Bk - Black
- Rd - Red

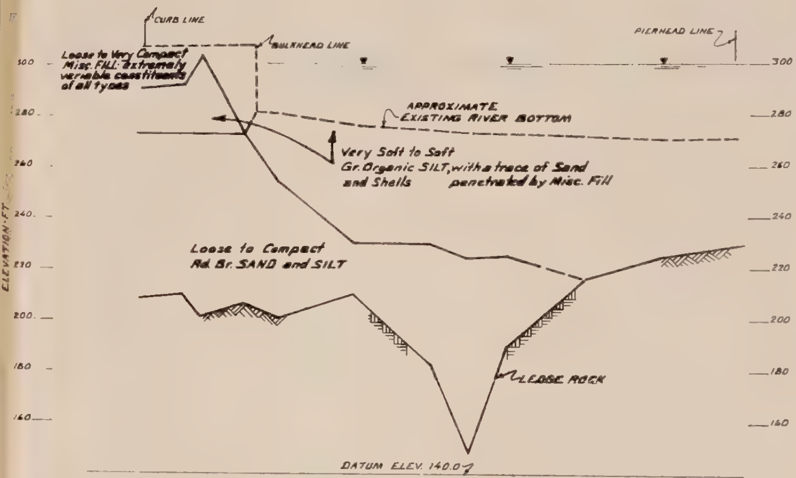
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE SECTIONS
C-C AND D-D

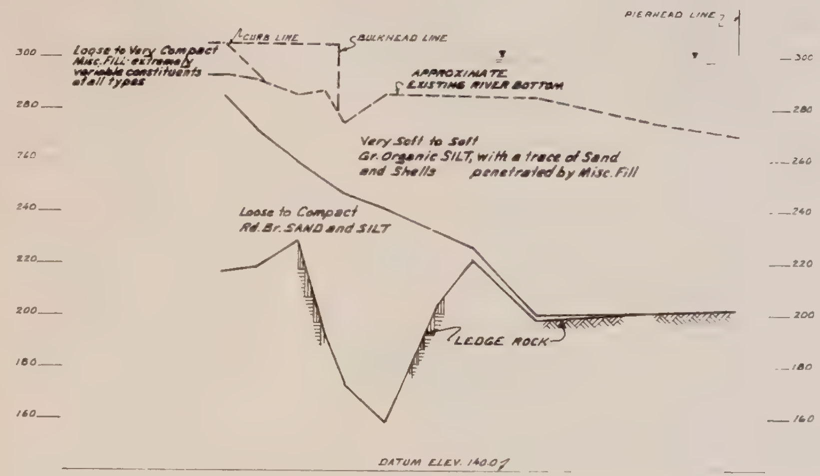
APPROVED Oct. 11 1972
[illegible signature]
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 I



SECTION E-E

SCALE. HORIZONTAL: 1" = 100'
VERTICAL. 1" = 20'



SECTION F-F

SCALE HORIZONTAL: 1" = 100'
VERTICAL. 1" = 20'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

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PREPARED BY Jim Simmons
DRAWN BY J. Masi
CHECKED BY R. J. Cheney

See Drawing No. ... 4 for General Notes

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " " "
"trace"	10% to less " " "

Color

BR - Brown
Gr - Gray
Bk - Black
Rd - Red

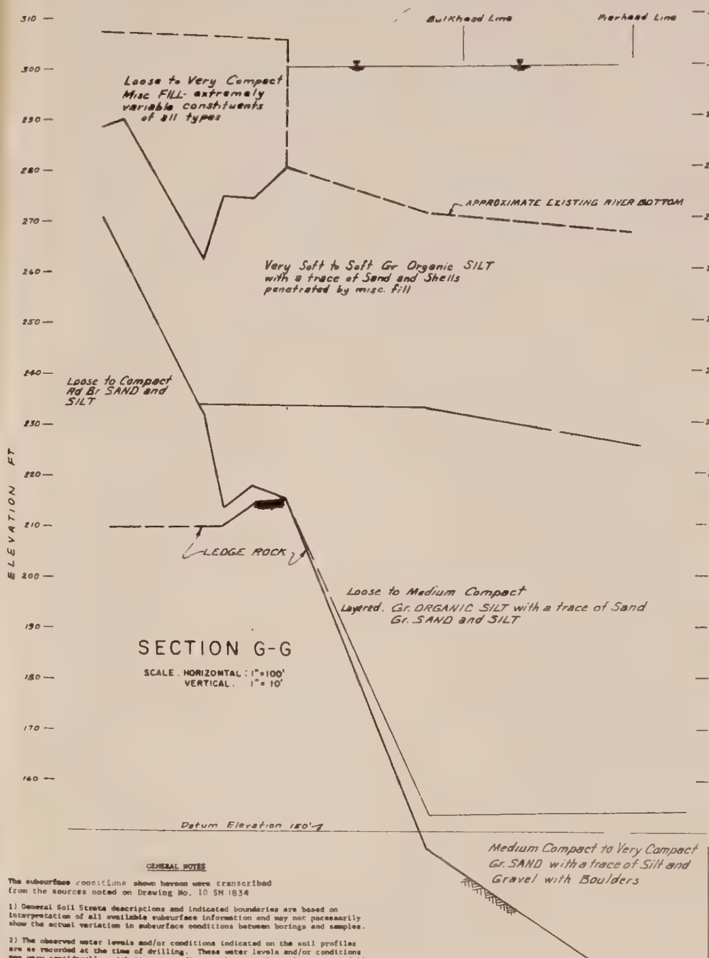
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE SECTIONS
E-E AND F-F

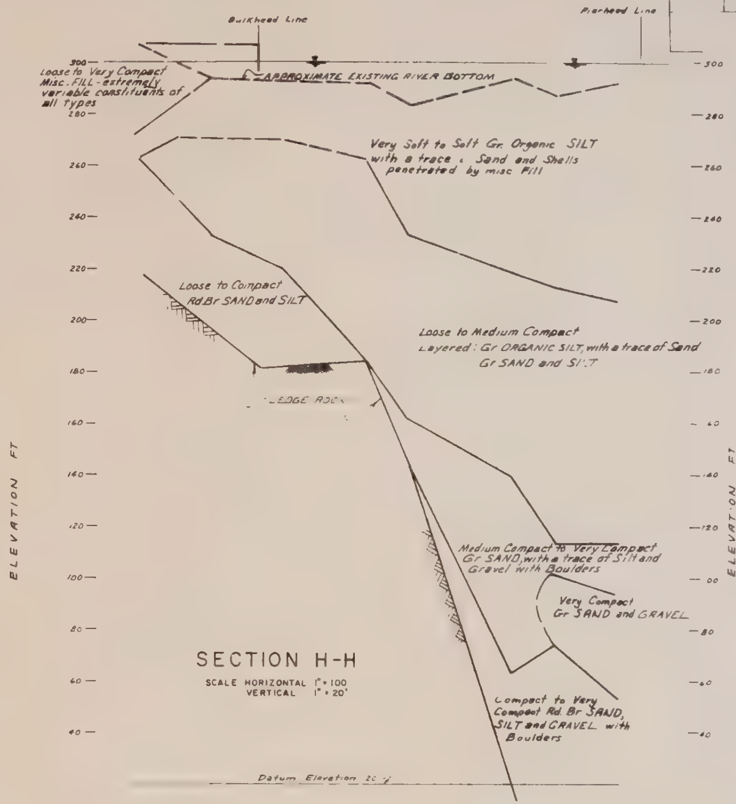
APPROVED Oct 1971
Wm. P. Hofmann
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1835 K



SECTION G-G

SCALE. HORIZONTAL: 1" = 100'
VERTICAL. 1" = 10'



SECTION H-H

SCALE HORIZONTAL 1" = 100
VERTICAL 1" = 20'

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jon Simmons
DRAWN BY N. Pulen
CHECKED BY R. J. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35
Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12-20
Hard	over 20

Amount of Component Material	
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " "
"trace"	10% to less " "

Color
BR - Brown
Gr - Gray
Bk - Black
Rd - Red

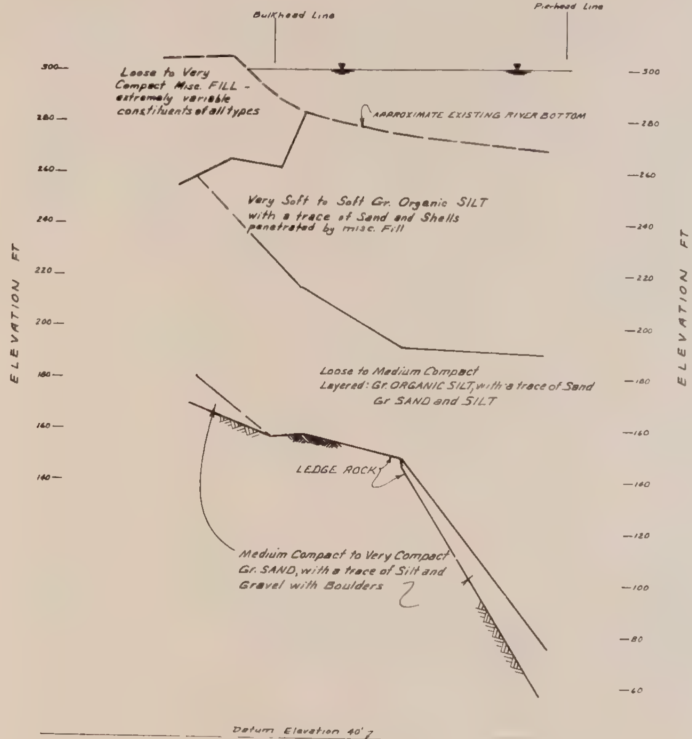
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE SECTIONS
G-G AND H-H

APPROVED Oct 11 1972
DIRECTOR

REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 SM 1836J



SECTION I-I

SCALE HORIZONTAL 1" = 100'
VERT 1" = 20'

See Drawing No. 10S 18 - for General Notes

GENERAL NOTES

The subsurface conditions shown hereon were transcribed from the sources noted on Drawing No. 10 SM 1834

1) General Soil Strata descriptions and indicated boundaries are based on interpretation of all available subsurface information and may not necessarily show the actual variation in subsurface conditions between borings and samples.

2) The observed water levels and/or conditions indicated on the soil profiles are as recorded at the time of drilling. These water levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

3) Sound engineering judgment was exercised in preparing the subsurface information presented hereon. This information was prepared and is intended for State design purposes only. Its presentation on the plans or elsewhere is for the purpose of providing others with access to the identical information available to the State. This information is presented in good faith but is not intended as a substitute for personal investigation, interpretations or judgment of the Contractor.

PREPARED BY Jim Simmons / Thomas Cark
DRAWN BY M. Palun
CHECKED BY R. J. Cheney

LEGEND

The following tables summarize the descriptive information used on this profile.

Density (Non Plastic Soils)	Avg. No. of Blows per foot for 18 in. drop of 300 lb. hammer 2 in. O.D. Sampler
Very Loose	0-3
Loose	3-8
Medium Compact	8-20
Compact	20-35
Very Compact	over 35

Consistency (Plastic Soils)	
Very Soft	0-2
Soft	2-6
Firm	6-12
Stiff	12 20
Hard	over 20

	Amount of Component Material
Primary	Component Capitalized
"and"	50% to 40% of secondary component
"some"	40% to 10% " "
"trace"	10% to less " "

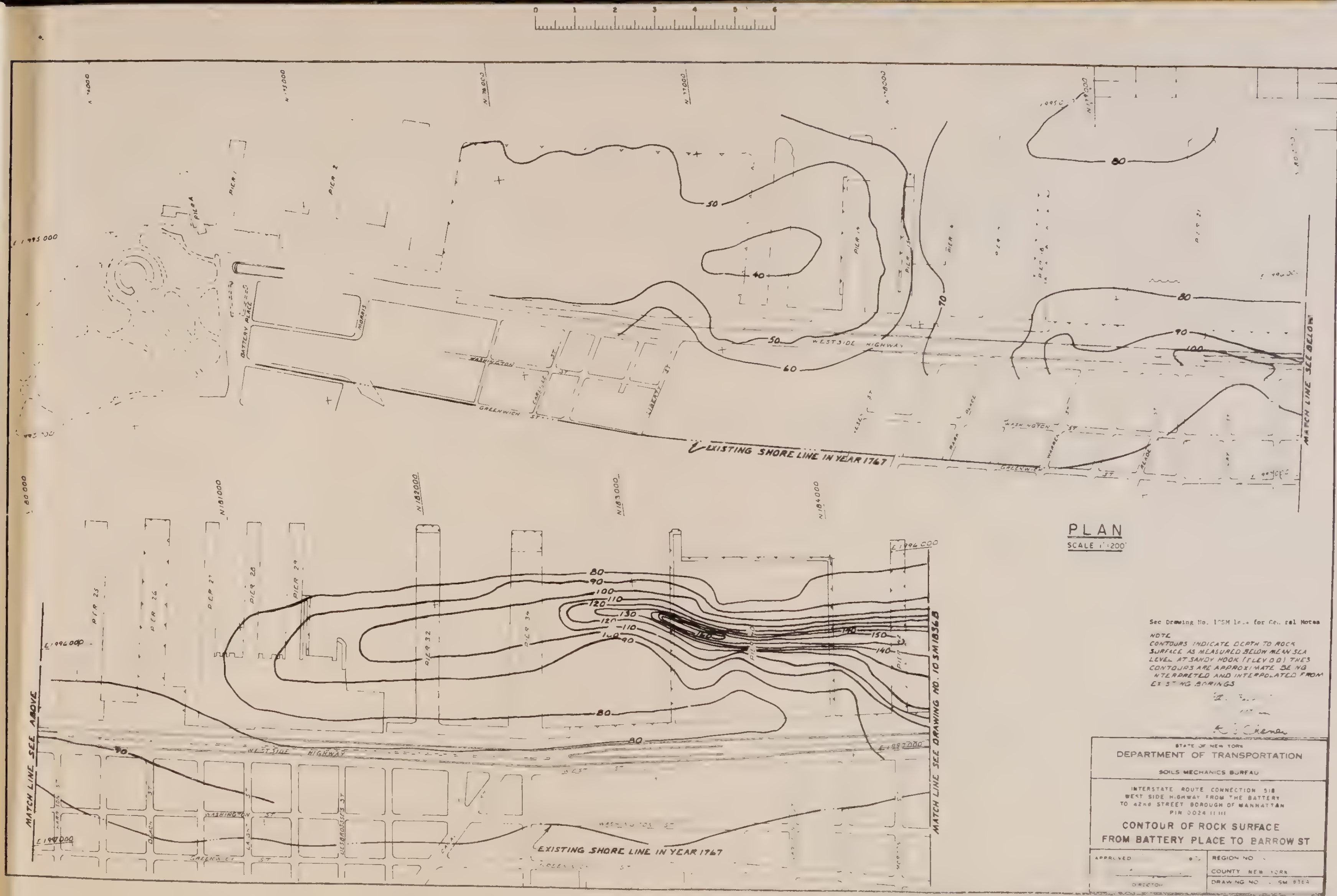
Color	
BR	Brown
Gr	Gray
Bk	Black
Rd	Red

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

GENERAL SUBSURFACE SECTIONS
I-I

APPROVED Oct. 1972
DIRECTOR
REGION NO
COUNTY NEW YORK
DRAWING NO 10 SM 1835 L



0 1 2 3 4 5 6
PIER A
PIER 1
PIER 2
BATTERY PLACE
MORRIS
WASHINGTON
GREENWICH ST
CARLISLE ST
LIBERTY ST
WEST SIDE HIGHWAY
EXISTING SHORE LINE IN YEAR 1767
MATCH LINE SEE BELOW
MATCH LINE SEE ABOVE
MATCH LINE SEE DRAWING NO. 10 SM 1836 B
50
40
60
70
80
90
100
110
120
130
140
150
PIER 25
PIER 26
PIER 28
PIER 29
PIER 32
PIER 34
PLAN
SCALE 1"=200'
See Drawing No. 10SM 1e.. for General Notes
NOTE
CONTOURS INDICATE DEPTH TO ROCK SURFACE AS MEASURED BELOW MEAN SEA LEVEL AT SANDY HOOK (ELEV 0.0) THES CONTOURS ARE APPROXIMATE BEING INTERPRETED AND INTERPOLATED FROM EXISTING BORINGS
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11.111
CONTOUR OF ROCK SURFACE
FROM BATTERY PLACE TO BARROW ST
APPROVED
DIRECTOR
REGION NO
COUNTY NEW YORK
DRAWING NO SM 836A

MATCH LINE SEE DRAWING NO. 10 SM 1836A
MATCH LINE SEE BELOW
MATCH LINE SEE ABOVE
WEST SIDE HIGHWAY
WASHINGTON ST
EXISTING SHORE LINE IN YEAR 1767
EXISTING SHORE LINE IN YEAR 1767
PLAN
SCALE 1:200
NOTE
CONTOURS ARE APPROXIMATE BEING INTERPRETED AND INTERPOLATED FROM EXISTING BORINGS
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
CONTOUR OF ROCK SURFACE
FROM BARROW ST TO 42ND ST
APPROVED
DIRECTOR
REGION NO
COUNTY NEW YORK
DRAWING NO

Hole No. P-21

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
B.S.M. PROJ. NO.
HOLE NO. P-21
LINE & STA. N179548 E995626
OFFSET

PROJECT PIN 0024.11 Miller (W Side) Highway
QUAD. LOCATION
SOIL SERIES
DATE, START 5/3/72
DATE, FINISH
SURF. ELEV. 30520
DEPTH TO WATER Variable (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4½" I.D. 4"
SAMPLER O.D. 2" I.D. 1⅜"
WEIGHT OF HAMMER 300
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	27.5' from pier deck to top of mud water elev fluctuates with tide. Attempted undisturbed at 30-31.5 No recov. Weight of casing was sufficient to progress casing to 52' without having to use hammer.
Soft Organic Silt	J-1 30'-32' T-2 35'-36.5' J-3 40'-41.5' T-4 47'-48.5'
Organic Silt	
Organic Silt	J-5 52'-53.5
Organic Silt and Rock Frag.	
Organic Silt Some Rock Frag. and Sand	
Organic Silt	
	T-9 72'-73.5'
Top of Rock	
Summary of rock drilling NX-5' double tube BBL. Run #1 77'8"-82'8" 65% recov 27 pcs Soft surface Wedging and Whip in Rods Probably accounts for poor recovery Run #2 82'8"-87'8" 80% recov 7 pcs 1'3" quartz intrus 84'8"± to 86'±	Wood in wash at 77' J-6 77'-77.6' Soft rock in shoe of spoon Run #3 87'8"-92'8" 95% recov 178 pcs Run #4 92'8"-97'8" 3 pcs 100% recov 36" longest pc.

WATER
MANHATTAN SCHIST

THE SUBSURFACE INFORMATION SHOWN HEREON WAS OBTAINED FOR STATE DESIGN AND ESTIMATE PURPOSES. IT IS MADE AVAILABLE TO BIDDERS ONLY THAT THEY MAY HAVE ACCESS TO IDENTICAL INFORMATION AVAILABLE TO THE STATE. IT IS PRESENTED IN GOOD FAITH, BUT IS NOT INTENDED AS A SUBSTITUTE FOR INVESTIGATIONS, INTERPRETATION OR JUDGMENT OF THE BIDDER.

DRILL RIG OPERATOR [redacted] Kenipp
SOIL DESCRIPTIONS J. C. Griek
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-21

Hole No. P-21A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
B.S.M. PROJ. NO.
HOLE NO. P-21A
LINE & STA. N179548 E995626
OFFSET

PROJECT Miller (West Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START 5/16/72
DATE, FINISH 5/18/72
SURF. ELEV. 305.20
DEPTH TO WATER

CASING O.D. I.D. 4"
SAMPLER O.D. 3" Tube
WEIGHT OF HAMMER 300
INSIDE LENGTH OF SAMPLER
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	This boring progressed in an attempt to obtain continuous tube samples in the top 20' of the river bottom.
Black Soft Silt	T-1 22'-23.5' partial recov. T-2 23.5'-25.0' T-3 25.0'-26.5' T-4 26.5'-28.0' T-5 28.0'-29.5' T-6 29.5'-31.0' T-7 31.0'-32.5' T-8 32.5'-34.0' T-9 34.0'-35.5' T-10 35.5'-37.0' J-11 37.2'-38.8'
Refusal on tube press at 37.2' J-11 wood & O.L.	Samples sent to S.M.B. via Cardinale on 5/19/72±

WET ORGANIC
BLACK

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DRILL RIG OPERATOR DeKenipp
SOIL DESCRIPTIONS
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-21A

Hole No. P-40

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
B.S.M. PROJ. NO.
HOLE NO. P-40
LINE & STA. N183684 E995275
OFFSET

PROJECT Miller (W. Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START 7/6/72
DATE, FINISH
SURF. ELEV. 305.63
DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4½" I.D. 4"
SAMPLER O.D. 2" I.D. 1⅜
WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 18"
HAMMER FALL CASING 18 SAMPLER 18

DESCRIPTION OF SOIL AND ROCK	REMARKS
	Vane Shear Test on this Pier Coordinate location N 183750 E 1995200
Organic Silt	
Trace Rock Fragments	
Some Rock Fragments	
100'-111'± Coarse Sand Trace of Silt and Gravel	Running Sand
111'-121'± Fine Sand Some Silt Trace Gravel	
123' Top of Rock Casing Seated to 123' 9"	
Drilled with Diamond Bit	

CONTINUED

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DRILL RIG OPERATOR DeKenipp
SOIL DESCRIPTIONS J. C. Griek
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR. J. C. Griek
SHEET ___ OF ___. HOLE NO. P-40

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11 III

SUBSURFACE EXPLORATION LOGS

PREPARED BY
DRAWN BY
CHECKED BY

REGION NO. 10
COUNTY NEW YORK
DRAWING NO.

0 1 2 3 4 5 6

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY Manhattan
B.S.M PROJ. N° 0024.11

HOLE NO. P-76
LINE & STA. N194391 E997757
OFFSET ____

PROJECT Miller Expy (West Side Hwy) Pier 76
QUAD. LOCATION ____ DATE, START ____ SURF. ELEV. 393.78
SOIL SERIES ____ DATE, FINISH ____ DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. 4" I.D. 3½"
SAMPLER O.D. 3½" I.D. 3"
WEIGHT OF HAMMER 300 lbs.
INSIDE LENGTH OF SAMPLER 20"
HAMMER FALL CASING 18" SAMPLER 18"

DEPTH	DESCRIPTION OF SOIL AND ROCK	REMARKS
0–50		Conc. Deck; 30'; Depth varies due to tide; very soft mud bottom
	30'-50' Black Soft Silt. (Asphalt odor) Traces Wood [redacted] Mica	No blows on casing from 30'-40'. Had to hold casing from sinking into silt.
		1-No sample @ ' . Too soft.
		2- @45' only 5" recovery in shelby put into jar sample
		F- ress by hand
50–100	50'-60' Black Silt (Soft) (Asphalt odor) Trace Mica, Shells, Wood	T3 - 52'-53'8"
	Layers of fine sand	J4 - 53'8"-55'4"
	60'-93' Gray Silt Mica	T5 - 55'4"-57'
	Traces Fine Gray Sand, Trace Wood	T6 - 57'-58'8"
	93'-100' Gray Silt Heavy Wood	T7 - 58'8"-60'4"
		T8 - 61'0"-62'8"
		T9 - 62'8"-64'4"
		T10-64'4"-66'
		T11-66'-67'8"
		T12-67'8"-69'4"
		T13-69'4"-71'
		T14-71'-72'8"
		J15-73'0"-74'8"
		T16-78'-79'8"
		J17-83'-84'6"
		T18-88'-89'8"
		J19-93'-94'6"
		T20-98'-99'8"
		*Hit very heavy wood fill @99'5" bent shelby
		Had to drill wood with Hawthorne Bit from 99'5"-105'

CONTINUED

DEPTH	DESCRIPTION OF SOIL AND ROCK	REMARKS
100–150	100'-120' Gray Silt Layers of Gray Sand Some Wood Trace shell, Mica	J21 - 105'-106'6"
		[redacted]
		T23 - 113'-114'8"
		T24 - 119'-120'6"
		J25 - 124'-125'8"
		T26 - 129'-130'8"
		J27 - 134'-135'6"
		J28 - 139'-140'6"
		- 144'-145'
	120'-140' Gray Silt, Gray Fine Sand } Layers	J30 - 149'-150'6"
	Trace Shells,	
	140'-150' Gray Fine Mica Sand Trace + Silt	
150–200	150'-189' Gray Sand & Silt	J31 -154'-155'6"
		J32 -159'-160'6"
		J33 -165'-166'6"
		J34 -170'-171'6"
		-175'-176'6"
		-180'-181'6"
		-185'-186'6"
		-190'-191'6"
	189'-195' Very Dense Gray Sand Silt & Gravel Some Broken Rock	J39 -195'-196'6"
	195'-19 '4" Gray Fine Sand Trace Silt Trace Gravel	*13' Runup in casing after missed sample
	Top of Rock 197'4"	

CONTINUED

DEPTH	DESCRIPTION OF SOIL AND ROCK	REMARKS
200–	Run No. 1 197'4"-202'3" 4'10" recovery 99% 5 pieces Manhattan Shist	Took four runs into rock with NX double tube core barrel - diamond
210	Run No. 2 202'3"-204'4" 2'1" recovery 100% 4 pieces hard quartz Rock	
215	Run No. 3 204'4"-209'	
	Run No. 4	*Spring collapsed and went up into core barrel
	17 pieces quartz rock	
	Bottom of Hole 214'	
	Bottom 214'	

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DRILL RIG OPERATOR Kipybida
SOIL DESCRIPTIONS Lakatos
ROCK DESCRIPTIONS ____
DISTRICT SOILS ENGR. ____
SHEET __ OF __ HOLE NO. P-76

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
P.I.N. 0024 11 111

SUBSURFACE EXPLORATION LOGS

PREPARED BY E.E. Shepherd
DRAWN BY J.J. Mani
CHECKED BY R.S. Cheney
APPROVED Oct 13 1972 Wm P Hofmann
REGION NO 10
COUNTY NEW YORK
DRAWING NO 10 1847C

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU
SUBSURFACE EXPLORATION LOG
(STATE FORCES)

DISTRICT NO. 10
COUNTY New York
B.S.M. PROJ. NO.

HOLE NO. P-66
[redacted] N192055 E997208
OFFSET

PROJECT Miller (W. Side) Highway PIN 0024.11
QUAD. LOCATION
SOIL SERIES
DATE, START Feb. 14 '72
DATE, FINISH
SURF. ELEV. 303.12
DEPTH TO WATER (ALSO DESCRIBE UNDER "REMARKS")

CASING O.D. I.D. 4"
SAMPLER O.D. 2" I.D. 1⅜"
WEIGHT OF HAMMER 300#
INSIDE LENGTH OF SAMPLER 36"
HAMMER FALL CASING 18" SAMPLER 18"

Depth 0' – 100'

DESCRIPTION OF SOIL AND ROCK	REMARKS
Very soft Black organic Silt trace of wood, shells and [redacted]	Undisturbed Samples T-1 20' - 21'8" T-3 30' - 31'5" T-6 50' - 51'5" Vane Shear Tests 25' - 28' - J-2 35' - 38' - J-4 45' - 48' J-5 & 5A *Driving Casing stopped overnight 45' Undisturbed attempt - 4" Refusal No recovery
[redacted] Soft Gray Organic Silt trace sand	
Soft Gray Organic Silt with a [redacted] trace of sand and shells [redacted]	Undisturbed Samples T-8 - 60'-61'5" T-10 - 70'-71'5" T-12 - 80'-81'6" T-14 - 90'-91'5" Vane Shear Tests 55'-58' J-7-7A 65'-68' J-9-9A 75'-78' J-11-11A 85'-88' J-13-13A 96'-99' J-15-15A *Driving casing stopped overnight **Stopped over week end

Color: BLACK; GRAY

CONTINUED

Depth 100' – 200'

DESCRIPTION OF SOIL AND ROCK	REMARKS
[redacted] Loose layered Gray Sand and Silt and [redacted] Silt with a trace of Sand	Undisturbed Samples T-16 - 101'-102'5" T-18 - 112'-113'5" T-20 - 123'-124'5" T-22 - 133'-134'5" T-25 - 149'-150'5" Vane Shear Tests 106'-109' J-17-17A 118'-121' J-19-19A 128'-131' J-21
Gray Sand and Silt	Sand Stratum 139.5' - 144.5'
Medium compact Layered Gray Sand and Silt and Gray Organic Silt with a trace of Sand	Undisturbed Samples T-27 - 160'-161.5' T-29 - 170'-171.8' T-31 - 180'-181.5' T-33 - 190'-191.5' Atend of press of T-33 Rig Lifted off jacks *Stopped driving for day 165',180',195' **Stopped driving for week end 190'-5 days 200'-3 days

Sampler remarks: SPOON DROPPED (J19, J21)

Color: GRAY

CONTINUED

Depth 200' – 303'8"

DESCRIPTION OF SOIL AND ROCK	REMARKS
Medium compact layered Gray sand and silt and gray organic silt with a trace of sand	4" casing to 217'± 217' to BX Flush joint washed to 245.3'
	Artesian Pressure while sampling 236'-238'
Compact brown Gravel some sand	Silt ends at 245.3'
Compact Brown Gravel some sand	Drilled ahead of flush joint casing with Hawthorne bit 250'-262'
	Drove BX flush joint 262-281'8"
Very compact Rd. Brown Sand some Gravel	Samp 49 25.5' of run up Samp 50 20.0' of run up
Top of Rock 281'8" Run #1 AX DBL Tube Core BBL. 281'8"-291'8" 96% Recov. Run #2 291'8"-293'8" Core wedged gravel fell in hole after 1st Run 1'10" recovered Run #3 293'8"-303'8" 97% Recovered	Samp 52 Sample spoon bent no recovery, spoon apparently followed pitch of rock (Bottom of Hole)

Color: GRAY; BROWN; RED BROWN; MANHATTAN SCHIST

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DRILL RIG OPERATOR K. Dekenipp
SOIL DESCRIPTIONS
ROCK DESCRIPTIONS
DISTRICT SOILS ENGR.
SHEET ___ OF ___ HOLE NO. P-66

PREPARED BY E. E. Shaghnd
DRAWN BY J. Vmar
CHECKED BY R. S. Cleary

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11.111

SUBSURFACE EXPLORATION LOGS

APPROVED Oct 3 1972
REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 18470

SUMMARY OF LABORATORY TEST DATA

Sample Number	Elevation (Datum MHL+300)	Visual Description	Natural Water Content % Average of Entire Sample	Liquid Limit	Plasticity Index	Organic Content	Average Wet Density PCF	Specific Gravity of Solids	Type of Test	Overburden Pressure PSF	Shear Stress @ Failure for S1 psf	Confining Stress, PSF	Natural Water Content %	Water Content @ End of Test %	Natural Water Content %	Overburden Pressure PSF	Estimated Probable Preconsolidation Stress PSF	Compression Index Cc
		PIER 21																
J1	275.0	Gr & Br L, O-S w/wo pcs &Sh (M-W-LPL)	159															
T2	270.0	Gr L, O & FS w/Sh (M-SF-LPL)	111.2	115.5	65.6	12.8	86.4	2.44	CU CU CU	270 270 270	230 1060 2000	288 2736 5040	114.2 117.7 115.9	104.5 73.1 61.0	107.4	270	390	1.00
J3	265.0	Gr & Br L, O-S w/wo pcs & Sh (M-W-LPL)	159															
T4	258.0	Dk Br & Gr L, O-S w/Sh (M-SF-LPL)	112.4	114.0	66.8		87.4	2.63	CU CU CU	400 400 400	310 1080 1970	432 2880 5328	116.0 115.7 116.8	104.2 73.4 63.0	113.6	420	480	1.08
J5	253.0	Gr & Br OL-S (M-LPL)	102															
J6	248	Gr & Br G, R to FS & LAO (M-W-NPL)	44															
J7	243	Gr & Br G, R to FS&LAO & Mica (M-W-NPL)	49															
J8	238	Gr & Br OL-S w/pcs Br F to RS, L-O w/Sh (M-LPL)	62															
T9	233	Dk Gr G, R to FS & L & Sh &O w/brick & Mica (M-Loose-NPL)	38	117.5	63.6		92.3	2.60	CU CU CU	1220 1220 1220	320 820 1280	720 3168 5472	89.7 87.5 92.8	83.5 69.1 67.0				
J10	228	Gr OL-S (M-LPL) Gr Br L, Mica &O-S (M-LPL)	118 166															
		PIER 21A																
T1	283	Gr OL	260															
T2	281.5	Gr L, FS&O w/Sh & Oil odor (M-SF-NPL)	182.0	125.0	78.1	12.2	82.2	2.58	CU CU CU	50 50 50	110 1300 2420	72 2736 5428	154.1 159.0 159.1	122.4 69.1 59.7	206.6	50	-	2.11
T3	280	Gr OL-S&Sh (M-SF-NPL)	145.1	114.1	68.9	12.7	82.0	2.54	CU CU CU	75 75 75	60 950 680	72 2736 5328	150.1 157.9 153.0	123.2 67.9 68.6	136.6	75	300	1.28
T4	278.5	Gr OL-S&C w/wo pcs. (M-SF-NPL)	138.2	32.1	12.2	14.1	82.8	2.52	CU CU CU	85 85 85	60 485 1025	72 2736 5328	140.8 148.3 146.6	116.0 66.8 55.7	131.2	85	300	1.31
T5	277	Gr OL-S (W-SF-NPL)	148.0	70.9	19.9		82.7	2.54	CU CU CU	115 115 115	340 1220 2300	288 2736 5328	131.0 153.5 155.4	84.0 65.3 57.2	149.5	115	375	1.21
T6	275.5	Gr OL-S&Sh & C w/wo pcs (M-SF-LPL)	118.6			11.8	84.6	2.58	CU CU CU	145 145 145	75 1000 2190	72 2736 5328	118.0 122.2 123.2	107.9 61.0 55.9	116.1	145	330	1.27
T7	274.0	Gr OL-S&C (M-SF-NPL)	125.3			14.3	85.0	2.52	CU CU CU	180 180 180	105 1020 2240	144 2380 5472	122.6 124.8 123.7	107.0 67.2 58.1	131.6	180	270	1.41
T8	272.5	Gr OL-S&C&Sh (M-SF-NPL)	126.6			12.6	84.8	2.52	CU CU CU	220 220 220	75 950 2050	144 2880 5472	122.4 123.6 127.3	109.7 67.6 58.4	133.0	220	310	1.42
T9	271.0	Gr OL-C&S Sh&O (M-SF-NPL)	124.4			14.0	85.0	2.49	CU CU CU	250 250 250	110 1060 2200	144 2880 5472	122.3 123.4 122.5	110.8 69.9 59.2	129.2	250	320	1.54
T10	269.5	Gr OL-S&C&Sh (M-SF-NPL)	114.4	66.3	25.1	10.1	86.6	2.49	UU •	275	132.2	2500	113.4		115.4	278	310	1.18
J11	268.0	Gr & Br OL w/wo pcs (M-W-NPL)	145															

SUMMARY OF LABORATORY TEST DATA

Sample Number	Elevation (Datum MHL+300)	Visual Description	Natural Water Content % Average of Entire Sample	Liquid Limit	Plasticity Index	Organic Content	Average Wet Density PCF	Specific Gravity of Solids	Type of Test	Overburden Pressure PSF	Shear Stress @ Failure for S1 psf	Confining Stress, PSF	Natural Water Content %	Water Content @ End of Test %	Natural Water Content %	Overburden Pressure PSF	Estimated Probable Preconsolidation Stress PSF	Compression Index Cc
		PIER 40																
T1	279	Dk Gr OL																
T2	273	Dk Gr OL-G																
T3	276	Dk Gr OL-G																
T4	274	Dk Gr OL-G (W-SF-NPL)	243															
J5	273	Poss. Fill Material Bk & Br OL-S&G w/pcs concrete (W-NPL)	183															
J6	270	Bk G-R to FS&LAO w/wo pcs. (W-NPL)																
T7	265	Poss. Fill Material BkOL-G w/wo pcs. (M-SF-NPL)																
T8	263	Poss. Fill Material BkOL-G w/wo pcs. (M-SF-NPL)	65															
T9	261	BkOL-G w/wo pcs. (M-SF-NPL)	115															
T10	260	BkOL-G w/wo pcs. (M-SF-NPL)																
J11	259	BkOL, G&R to FS (W-NPL)	97															
J12	255	Poss. Fill Material Br&Bk Shist, L&F to RS&O-G (M-NPL)	75															
J13	251	Gr&Bk OL-S&G (M-NPL)	70															
T14	246	Gr & Bk OL-C&S & Sh (M-SF-FM-LPL)	63.2	57.6	30.4	3.90	102.1	2.66	CU CU CU	570 570 570	600 1400 2120	576 3024 5328	61.3 62.6 62.8	57.1 46.6 43.9	64.5	570	1150	.580
J15	240	Gr & Br OL-S (M-LPL)	60															
T16	235	Gr OL, FS-G (M-VSF-NPL)	58.2			3.52	104.7	2.72	CU CU CU	830 830 830	620 1370 2120	720 3168 5472	53.0 53.8 55.5	47.7 41.4 38.4	55.7	830	940	.35
J17	230	Gr & Br CL-S & C & Sh (M-LPL)	59															
J18	225	Gr & Br OL-S & C & Sh (M-NPL)	60															
J19	219	Rd & Br R to FS, L-G (M-W-NPL)																
J20	213	Rd & Br R to FS-L&G (M-NPL)																
J21	207	Rd & Br F to RS-L (M-NPL)																
J22	201	Rd & Br R to FS-L&G (M-NPL)																
J23	196	Br F to RS,L (M-NPL)																
J24	190	Br F to RS, L-G (M-NPL)																
J25	185	Br F to RS, L-G (M-NPL)																

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION '51B'
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024.11.111

SUMMARY OF LABORATORY TEST DATA
BORING NO. P-21, P-21A AND P-40

PREPARED BY P.A. Walton
DRAWN BY
CHECKED BY
APPROVED Oct. 13 1972
REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10

SUMMARY OF LABORATORY TEST DATA

Sample Number	Elevation (Datum MHL+300)	Visual Description	Natural Water Content % Average of Entire Sample	Liquid Limit	Plasticity Index	Organic Content	Average Wet Density PCF	Specific Gravity of Solids	Type of Test	Overburden Pressure PSF	Shear Stress @ Failure for σ3 psf	Confining Stress PSF	Natural Water Content %	Water Content @ End of Test %	Natural Water Content %	Overburden Pressure PSF	Estimated Probable Preconsolidation Stress PSF	Compression Index Cc
		PIER 66																
T-1	280	Bk L, O-Wo & SH & G/Bk L, O-S(M-VSF-NPL)	102	94.2	55.7	8.18	87.2	2.58	UU•	0	140	360	89.7		97	0	640	1.00
J2 J2A	275	Dk Gr L&O-S&G (M-LPL)	100 87															
T-3	270	Gr & Bk L, O-S & Sh (M-SF-LPL)	90.3	95.5	55.9		100.2	2.64	CU	525	380 580 770	504 1008 1584	85.7 86.8 87.0	78.8 74.8 70.4	94.0	525	700	1.06
J4 J4A	265	Dk Gr L&O-S w/Sh (M-MPL)	97 83															
J5 J5A	255	Gr L, O-S w/Sh (M-LPL)	60 56															
T6	250	Gr. O L Gr FS&L w/Sh (M-FM-LPL)	48.0	42.7	18.2	3.35	109.3	2.66	UU CU CU	1150 1150 1150	455 1310 2070	3460 1120 2390	45.9 45.0	41.2 36.8	56.8	1150	1150	.497
J7 J7A	244	Gr L, O-S w/SL (M-MPL)	59 57															
T8	240	Gr L, O-S w/SL (M-MPL)																
J9 J9A	235	Gr L, O-S w/SL (M-MPL)	58 62															
T10	230	Dk Gr O L Gr FS&L (M-FM-LPL)	52.0	59.2	29.0	3.84	105.8	2.70	CU CU CU	1900 1900 1900	1280 2270 3000	1872 3744 5472	51.3 53.1 52.3	42.9 38.1 35.9	51.7	1900		.390
J11 J11A	225	Dk Gr OL-S (M-SF-LPL)	59 51															
T12	220	Dk Gr OL w/pocs, Gr FS (M-SF-FM-LPL)	57.2	56.0	28.0	3.74	104.0	2.70	UU•• UU• UU	2400 2400 2400	221 374 726.5	6500 6500 6500	55.5 55.5 55.5		58.5	2400	1950	.601
									CU CU	2400 2400	1313 2980	2304 6480	55.9 56.1	50.1 41.4				
J13 J13A	215	Dk Gr OL-S (M-SF-FM-LPL)	60 54															
T14	210	Dk Gr OL-S (M-SF-FM-LPL)	57.8	57.6	28.5	4.34	103.2	2.69	CU CU CU	2800 2800 2800	1300 2750 4300	2592 5040 7488	55.2 55.6 54.6	45.3 41.5 38.5	60.5	2800	2250	.690
J15 J15A	204	Gr OL-S w/Sh (M-SF-FM-LPL)	62 52															
T16	199	Gr OL-S w/Sh (M-SF-FM-LPL)	44.9	48.0	23.2	3.56	110.1	2.72	UU• UU••	3200 3200	837.5 258.7	8500 8500	46.0 46.5		43.9	3150	3000	.429
									CU CU CU	3200 3200 3200	1320 2380 3450	3024 5760 8496	44.0 44.4 43.8	36.8 34.4 32.0				
J17 J17A	194	Gr OL-S w/thin layers Gr FS w/Sh (M-FM-LPL)	40 40															
T18	188	Layered Gr. OL-S/Gr FS-L (M-FM-LPL)	38.2	29.5	6.3	2.91	114.2	2.72	UU CU CU	3700 3700 3700	567 1990 5090	9800 3600 9792	37.2 38.4 40.0	31.0 29.6	38.2	3700	4250	.294
J19 J19A	182	Gr L, FS/Gr OL (M-FM-LPL)	44 38															
T20	177	Gr L, FS, Gr OL (M-FM-LPL)	34.8				114.6	2.72		4200					34.8	4200	4200	.242
J21	172	Gr L, FS-O (M-FM-NPL)	38															
T22	167	Gr L, FS-O (M-FM-NPL)	33.9				115.2	2.70							33.9	4800	5100	.211
J23	162	Gr. L, FS&O (M-FM-NPL)	40															
J24	156	Gr L, FS&O (M-FM-NPL)	47															
T25	151	Gr OL-S (M-SF-LPL)	48.5	54.6	32.0	2.50	109.3	2.73	UU• CU CU	5600 5600 5600	429.5 2500 5000	13500 5328 14112	35.8 54.7 54.3	47.7 35.6	55.1	5600	4400	.800

SUMMARY OF LABORATORY TEST DATA

Sample Number	Elevation (Datum MHL+300)	Visual Description	Natural Water Content % Average of Entire Sample	Liquid Limit	Plasticity Index	Organic Content	Average Wet Density PCF	Specific Gravity of Solids	Type of Test	Overburden Pressure PSF	Shear Stress @ Failure for σ3 psf	Confining Stress PSF	Natural Water Content %	Water Content @ End of Test %	Natural Water Content %	Overburden Pressure PSF	Estimated Probable Preconsolidation Stress PSF	Compression Index Cc
		PIER 66 (CONTINUED)																
J26	145	Gr. L, O-S w/thin layers Gr FS w/Sh (M-LPL)	53															
T27	140	Gr L-O Gr FS-L (M-SF-LPL)	50.0	49.4	26.5		108.0	2.74	CU CU CU	6100 6100 6100	1375 4750 5375	5760 10512 14400	45.3 44.9 46.3	39.1 34.3 33.4	54.7	6100	5000	.759
J28	135	Gr L-O Gr FS-L (M-SF-LPL)	48															
T29	130	Gr L-O Gr FS-L (M-SF-LPL)	42.8	34.7	14.0		110.4	[illegible]	CU CU	6600 6600	3500 7600	6336 11400	38.1 39.5	33.9 29.0	[illegible]	6600	5300	[illegible]
J30	125	Gr L-O Gr FS-L (M-SF-LPL)	42															
T31	120	Gr L-O Gr FS-L (M-SF-LPL)	39.8	39.3	18.1		112.0	2.72	CU CU	7000 7000	4300 7500	6768 12096	41.0 40.0	35.8 29.5	38.8	7000	6600	.351
J32	115	Gr L-O w/thin layers Gr FS-L (M-SF-LPL)	40															
T33	110	Gr L, O-S & Mica/Gr FS, L-Mica (D-M-FM-NPL)	43.9				111.0	2.70	UU•	7500	142.7	12950	43.9					
J34	105	Gr L-S&O (M-NPL)	40															
J35	100	Gr L-S&O (M-NPL)	40															
J36	95	Gr L, FS-C&O & Mica (M-LPL)	41															
J37	90	Gr L, FS-C&O & Mica (M-LPL)	43															
J38	85	Gr L, FS-C&O & Mica (M-NPL)																
J39	79	Gr. L, FS-C&O & Mica (M-LPL)	49															
J40	74	Gr L, FS-O& Mica (M-NPL)																
J41	69	Gr L, FS-O & Mica (M-NPL)																
J42	64	Gr. L, FS-O& Mica (M-NPL)																
J43	59	L, FS-O& Mica (M-NPL)	52															
J44	55	Dk Gr L, R to FS & G-O (M-NPL)																
J45	50	Br G, F to RS-L (M-NPL)																
J46	44	Br G-S (M-NPL)																
J47	42	Br G-S (M-NPL)																
J48	38	Br F to RS-G&L (M-NPL)																
J49	33	Br F to RS-G&L (M-NPL)																
J50	28	Br F to RS-G&L (M-NPL)																
J51	23	Br F to RS, G-L (M-NPL)																

[illegible] FOR NOTES

PREPARED BY P.A. Walton
DRAWN BY [illegible]
CHECKED BY [illegible]

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 5:8
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 11

SUMMARY OF LABORATORY TEST DATA
BORING NO. 66

APPROVED OCT. 19 1972
[illegible]
DIRECTOR

REGION NO. 0
COUNTY NEW YORK
DRAWING NO. 10 SM .8408

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION			CLASSIFICATION PROPERTIES						PHYSICAL PROPERTIES — STRENGTH						CONSOLIDATION			
SAMPLE NUMBER	ELEVATION (DATUM MHL+300)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR σ_3 psf	CONFINING STRESS, σ_3 PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PROBABLE PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX C_c
		PIER 76																
J1	260	Gr & Br L, O & FS (M-W-NPL)	119															
J2	255	Br & Br L, O & FS (M-NPL)	62															
J3	249	Dk Br L, FS & SH & O w/OIL ODOR (M-SF-LPL)	40															
J4	[illegible]47	Br & Br L, O & SH-S w/OIL ODOR (M-NPL)	55															
T5	245	Dk Gr L, FS & SH & O (M-LOOSE-LPL)	59															
T6	243	Dk Gr L-O w/SH AND OIL ODOR (M-SF-L[illegible]L)	67															
T7	241	Dk Gr OL-S w/SH (M-SF-LPL)	71				33.3											
T8	240	Dk Gr OL w/SH (M-SF-LPL)	74				90.9											
T9	238	Dk Gr OL w/SH (M-SF-LPL)	67				95.											
T10	23[illegible]	Dk Gr OL (M-SF-LPL)	72				[illegible]5.3											
T11	235	Dk Gr OL (M-SF-LPL)	72				94.5											
T12	233	Dk Gr OL w/POCS. Gr FS-L (M-SF-LPL)	62				99.4											
T13	231	Dk Gr & Br OL w/THIN LAYERS Dk Gr FS-L (M-SF-FM-LPL)	66				96.9											
T14	230	Dk Gr L, FS&O (M-SF-FM-LPL)	56				99.6											
J15	228	Dk Gr & Br L, O-S w/SH (M-NPL)	53															
T16	223	Gr OL-S (M-SF-FM-LPL)	62.9	61.[illegible]	31.5	3.95	97.8	2.66	CU CU CU	1700 1700 1700	700 850 1780	1152 2592 3456	61.5 62.7 60.2	50.5 47.0 43.3	68.9	1700	1080	.510
J17	218	Gr. OL-S (M-LPL)	66															
T18	213	Gr. OL-S (M-SF-NPL)	58.8	60.0	28.1	3.70	100.4	2.66	CU CU CU	2000 2000 2000	960 1520 2050	1440 3024 4464	59.3 58.1 57.8	48.6 42.3 39.4	57.9	2000		.413
J19	208	Gr. & Br. OL-S w/LARGE WD. PCS. (M-LPL)	56															
T20	203	Dk Gr OL-S (M-SF-FM-NPL)	50.5	57.5	27.2	4.05	105.2	2.66	CU CU CU	2500 2500 2500	1380 2040 2900	1872 3744 5472	46.7 52.4 49.8	41.4 45.7 49.8	54.8	2500	1880	.439
J21	195	Gr OL-C&S (M-LPL)	52															
J22	192	Gr OL-C&S w/WD PCS. (M-LPL)	65															
T23	187	Gr OL-S w/SH (M-FM-LPL	53.2	54.6	29.0	4.18	106.4	2.69	CU CU CU	3200 3200 3200	1490 2200 3180	2980 5472 8064	54.0 53.5 54.2	43.8 41.5 38.4	55.1	3200	2450	.513
J24	182	Gr OL, FS-C w/WD PCS. (M-LPL)	41															
J25	176	Gr FS, L&O-C w/SH (M-NPL)	36															
T26	172	Gr Br FS-L Gr OL-S (M-SF-FM-NPL)	37	34.2	4.9	1.33	115.6	2.70	CU CU	4000 4000	2000 6800	3312 9504	38.8 36.5	34.5 28.9	36.2	4000		.189
J27	167	Gr Br FS-L Gr OL-S (M-SF-FM-NPL)	33															

SUMMARY OF LABORATORY TEST DATA

SAMPLE IDENTIFICATION			CLASSIFICATION PROPERTIES						PHYSICAL PROPERTIES — STRENGTH						CONSOLIDATION			
SAMPLE NUMBER	ELEVATION (DATUM MHL+300)	VISUAL DESCRIPTION	NATURAL WATER CONTENT % AVERAGE OF ENTIRE SAMPLE	LIQUID LIMIT	PLASTICITY INDEX	ORGANIC CONTENT	AVERAGE WET DENSITY PCF	SPECIFIC GRAVITY OF SOLIDS	TYPE OF TEST	OVERBURDEN PRESSURE PSF	SHEAR STRESS @ FAILURE FOR σ_3 psf	CONFINING STRESS, σ_3 PSF	NATURAL WATER CONTENT %	WATER CONTENT @ END OF TEST %	NATURAL WATER CONTENT %	OVERBURDEN PRESSURE PSF	ESTIMATED PROBABLE PRECONSOLIDATION STRESS PSF	COMPRESSION INDEX C_c
		PIER 76 (CONTINUED)																
J28	161	Gr FS-L&O (M-NPL)	31															
J29	156	Gr FS-L&O (M-NPL)	27															
J30	151	Gr OL, FS (M-NPL)	38															
J31	146	Gr OL, FS (M-NPL)	31															
J32	141	LAYERED Gr, OL-C Gr FS-L&O (M-NPL)	44															
J33	135	Gr Br FS, L&O (M-NPL)	41															
J34	130	Gr OL & Gr FS, L-O (M-NPL)	44															
J35	125	LAYERED Gr Br OL& Gr FS, L-O (M-NPL)	47															
J36	120	Br L,O-S/Gr OL/Br FS-L (M-NPL)	42															
J37	115	Gr & Br L, C-O (M-NPL)	55															
J38	110	Gr & Br L C-O Br FS, G-L (M-NPL)	44															
J39	105	Gr Br F to RS, G-L (M-NPL)																

NOTES

1. Visual Description of Soil Samples

Sample Color	Bk	Black
	Gr	Gray
	Br	Brown
	Rd	Red
Visual Description - Constituent	L	Silt
	S	Sand
	C	Clay
	O	Organic
	G	Gravel
	Wd	Wood
	Sh	Shells
Relative Percentage of Soil Constituent	&	40% - 50%
	,	10% - 40%
	-	[illegible]% - 10%
Consistency	M	moist
	W	wet
	Sf	soft
	Fm	firm
	NPL	non-plastic
	LPL	low-plastic
	MPL	medium-plastic
Miscellaneous	w/	with
	pocs	pockets
	pcs	pieces
	poss	possible
	F	fine
	R	coarse

2. Sample numbers prefixed by J indicate jar samples taken from a split spoon sampler. Numbers prefixed by T indicate undisturbed tube samples.

3. The elevations listed are referenced to the top of the recovered samples.

4. The triaxial strength tests were of the following types:
   CU - Consolidated Undrained test
   UU - Unconsolidated Undrained test

5. Shear strength tests on undisturbed materials were performed on samples 2.8" high and 1.4" in diameter. The unconsolidated undrained tests superscribed with an asterisk (UU*) were samples 7.0" high and 3.375" in diameter.

6. Triaxial strength tests superscribed with a double asterisk (**) indicate a remolded sample 7.0" high and 3.375" in diameter.

7. Compression Index (C_c) Straight line portion of the virgin compression curve of a consolidation test $e = e_0 - C_c \log P/P_0$

8. Load increments for consolidation tests were applied a maximum of three times per day with a minimum time interval between load applications of three hours. Longer durations were specified, as required, for samples with slower drainage rates.

9. The most probable preconsolidation stress (psf) was found by the standard Cassagrande construction

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

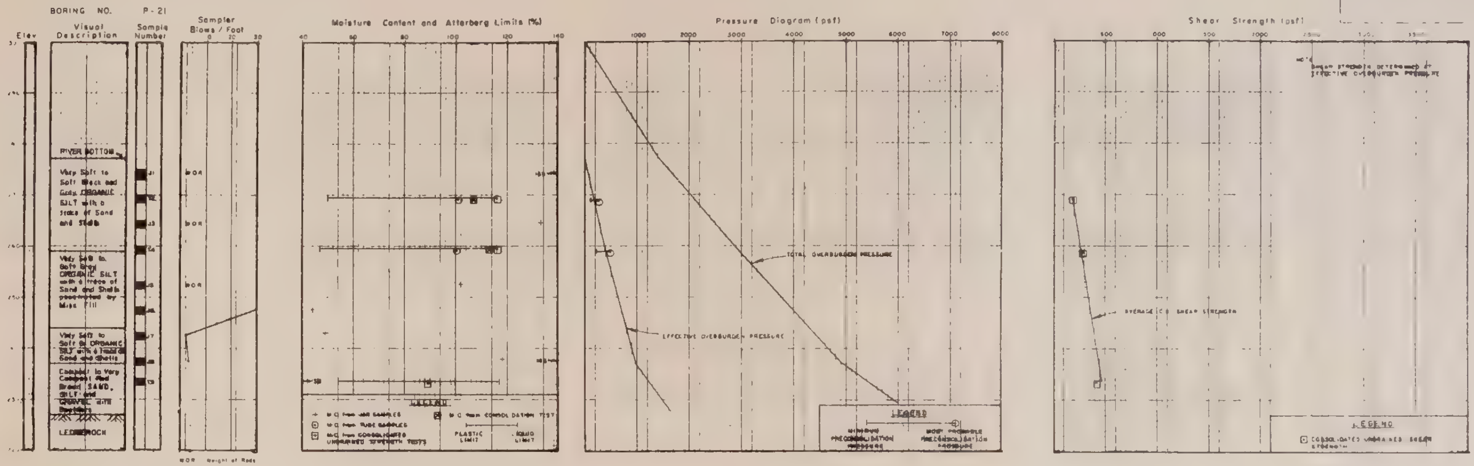
INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11 111

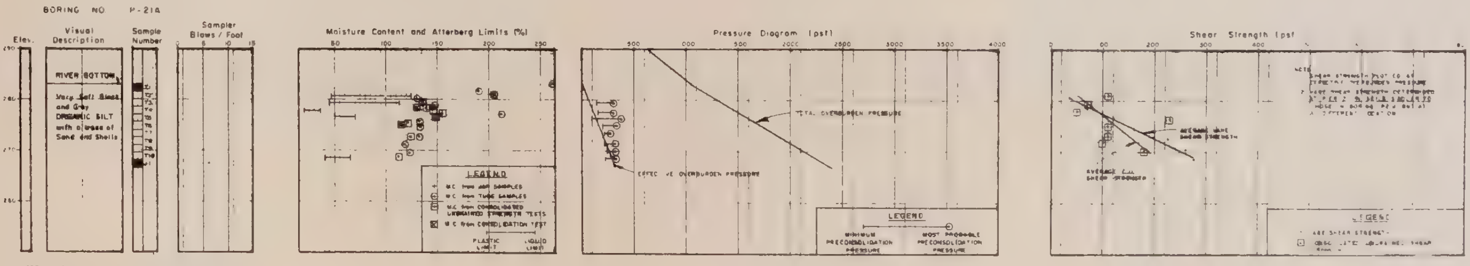
SUMMARY OF LABORATORY TEST DATA
BORING NO 76

PREPARED BY P. A. Walton
DRAWN BY J. Mann
CHECKED BY [illegible]

APPROVED Oct 13, 1972
[illegible]
DIRECTOR

REGION NO C
COUNTY NEW YORK
DRAWING NO 10 BM 1840 C





NOTE BORING P-21A WAS PROGRESSED ADJACENT TO BORING P-21 TO OBTAIN CONTINUOUS UNDISTURBED SAMPLES OF THE TOP 20 FT OF SOIL

NOTE
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10 SM 1840 A

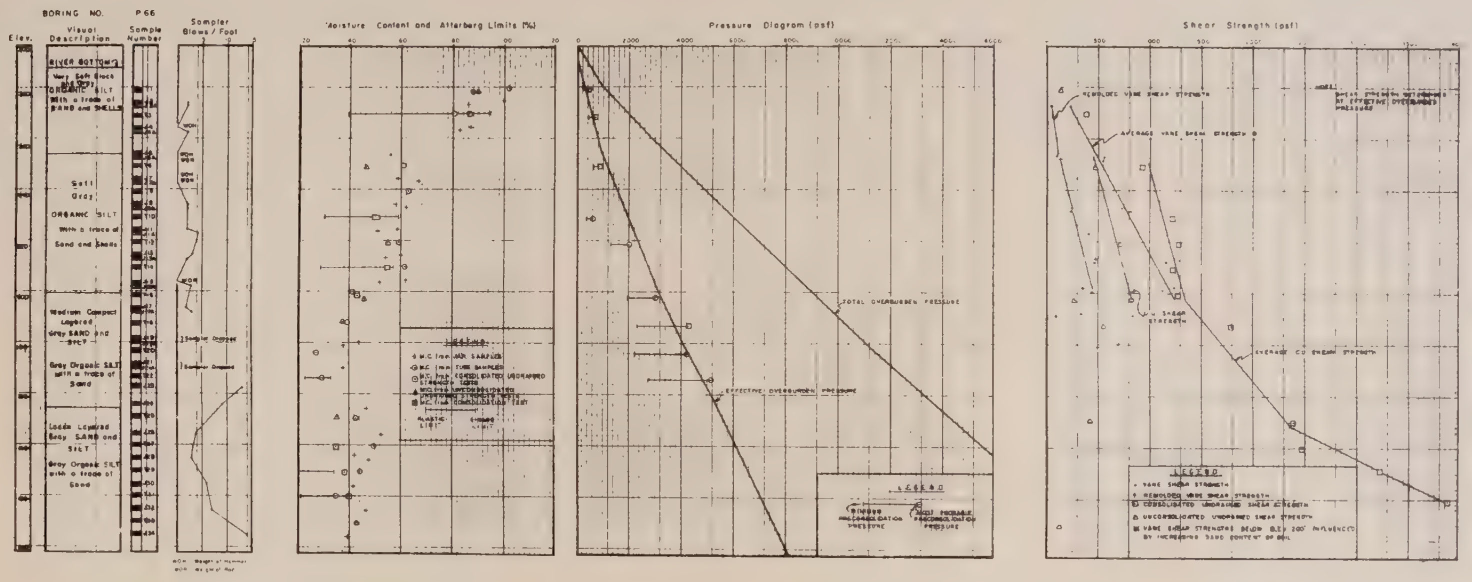
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET BOROUGH OF MANHATTAN
PIN 0024 11 11

SOIL PROPERTIES PROFILE
BORING NOS P-21 & P-21A

PREPARED BY
DRAWN BY
CHECKED BY

REGION 10
COUNTY NEW YORK
DRAWING NO



NOTE
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10 SM 1840 B

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
P N 0024 11111

SOIL PROPERTIES PROFILE
BORING NO P-66

PREPARED BY
DRAWN BY
CHECKED BY

OCT 3 [illegible]

REGION NO
COUNTY NEW YORK
DRAWING NO [illegible] SM 1846 B

SM 292 (11/67)

10SM1842A

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 518*
P.I.N. 0024.11.111

HOLE NUMBER *P21A* DEPTH ______

STATION ______ OFFSET ______

LABORATORY NUMBER ______

DATA CODE ______ MACHINE NUMBER ______

VISUAL DESCRIPTION ______
VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY ______ DATE ______

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT *206.6* %
WET DENSITY *79.3* PCF
SPECIFIC GRAVITY *2.50*
LIQUID LIMIT ______
PLASTIC LIMIT ______
PLASTIC INDEX ______
ORGANIC CONTENT ______ %

PERCENT FINER THAN
.074MM ______ .020MM ______ .002MM ______

PRECONSOLIDATION PRESSURE
MINIMUM ______ MAXIMUM ______

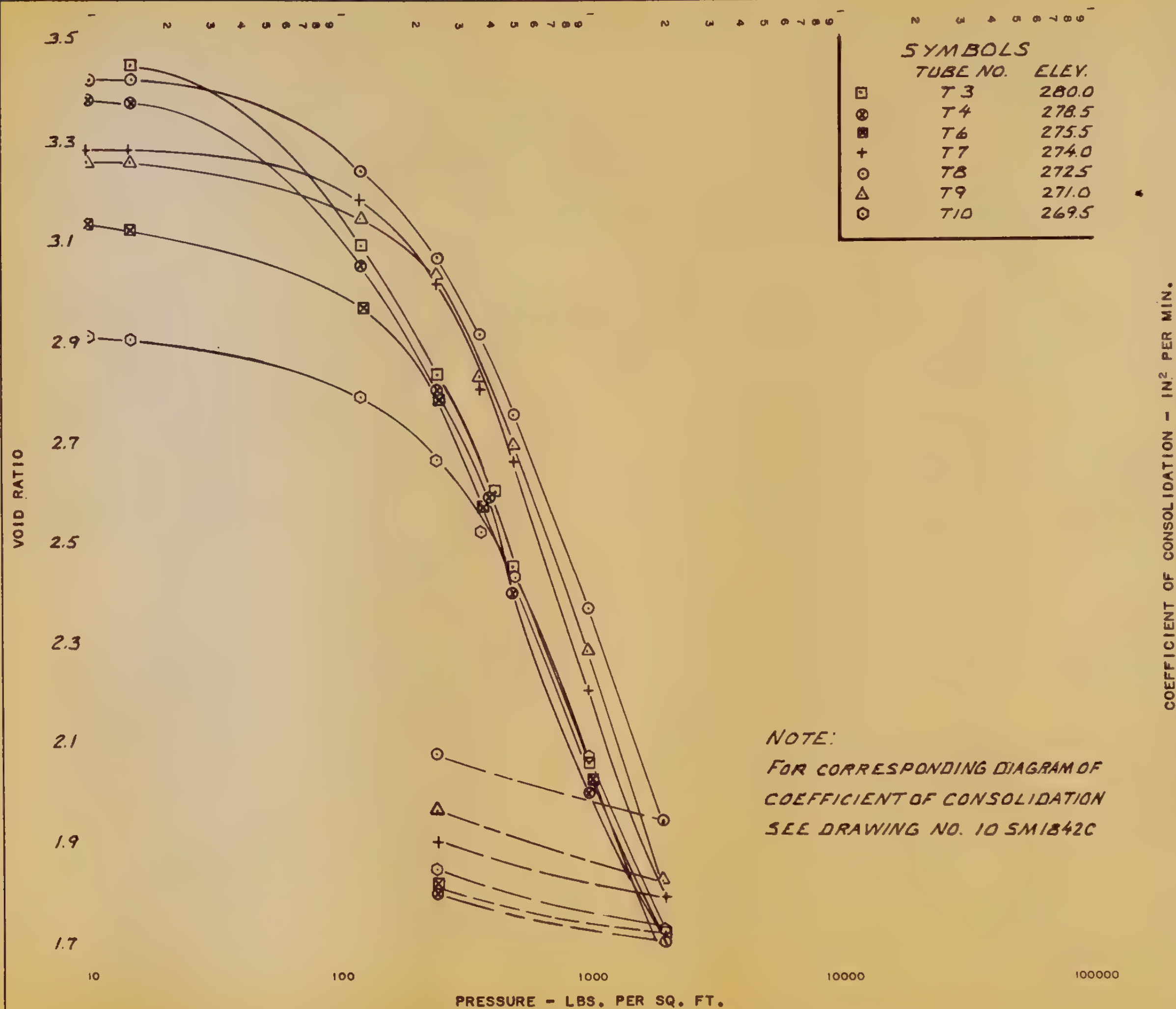
COMPRESSION INDEX ______

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10SM1840*

DRAWN BY *J. M.* DATE *10/13/72*
CHECKED BY *R. J. Cheney* DATE *10/13/72*

SM 292 (11/67)

10 SM 1842 B



SYMBOLS

Symbol	TUBE NO.	ELEV.
⊡	T3	280.0
⊗	T4	278.5
⊠	T6	275.5
+	T7	274.0
⊙	T8	272.5
△	T9	271.0
⊙	T10	269.5

NOTE:
FOR CORRESPONDING DIAGRAM OF COEFFICIENT OF CONSOLIDATION SEE DRAWING NO. 10 SM1842C

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT INTERSTATE ROUTE CONNECTION 518
P.I.N. 0024.11.111

HOLE NUMBER P 21A DEPTH ____

STATION ____ OFFSET ____

LABORATORY NUMBER ____

DATA CODE ____ MACHINE NUMBER ____

VISUAL DESCRIPTION
VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY ____ DATE ____

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	129.2 TO 136.6	%
WET DENSITY	81.6 TO 84.3	PCF
SPECIFIC GRAVITY	2.47 TO 2.52	
LIQUID LIMIT	95.5 TO 114.1	
PLASTIC LIMIT	39.6 TO 45.2	
PLASTIC INDEX	55.9 TO 68.9	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM ____ .020MM ____ .002MM ____

PRECONSOLIDATION PRESSURE
MINIMUM ____ MAXIMUM ____

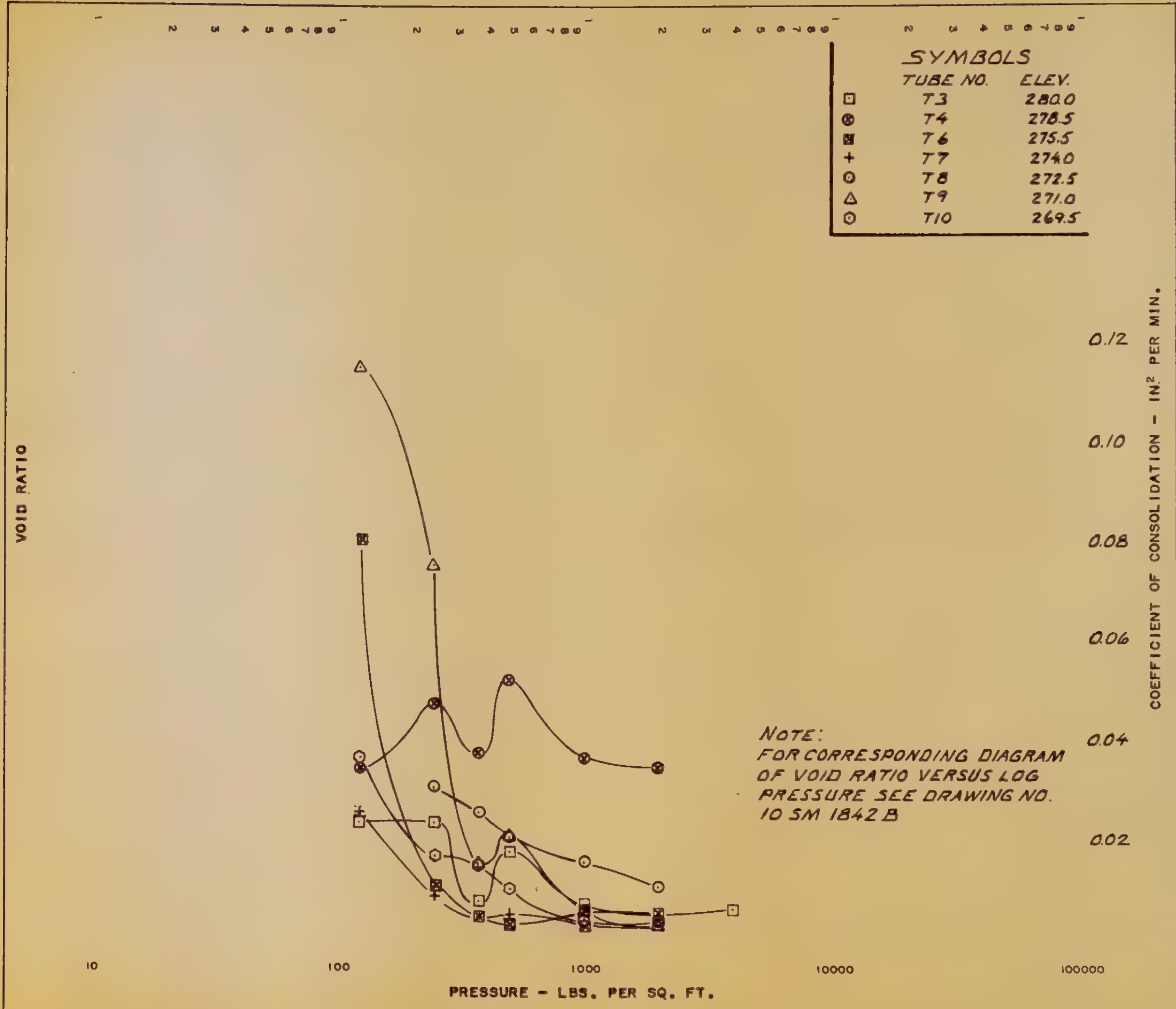
COMPRESSION INDEX ____

REMARKS: FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840

DRAWN BY [signature] DATE 10/13/72
CHECKED BY R.S. Cheney DATE 10/13/72

SM 292 (11/67)

10 SM 1842C



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 518*
P.I.N. 0024.11.111

HOLE NUMBER *P 21A* DEPTH ____

STATION ____ OFFSET ____

LABORATORY NUMBER ____

DATA CODE ____ MACHINE NUMBER ____

VISUAL DESCRIPTION *VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS*

SAMPLE PROFILE

TEST SET UP BY ____ DATE ____

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	*129.2 TO 136.6*	%
WET DENSITY	*81.6 TO 84.3*	PCF
SPECIFIC GRAVITY	*2.47 TO 2.52*	
LIQUID LIMIT	*95.5 TO 114.1*	
PLASTIC LIMIT	*39.6 TO 45.2*	
PLASTIC INDEX	*55.9 TO 68.9*	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM ____ .020MM ____ .002MM ____

PRECONSOLIDATION PRESSURE
MINIMUM ____ MAXIMUM ____

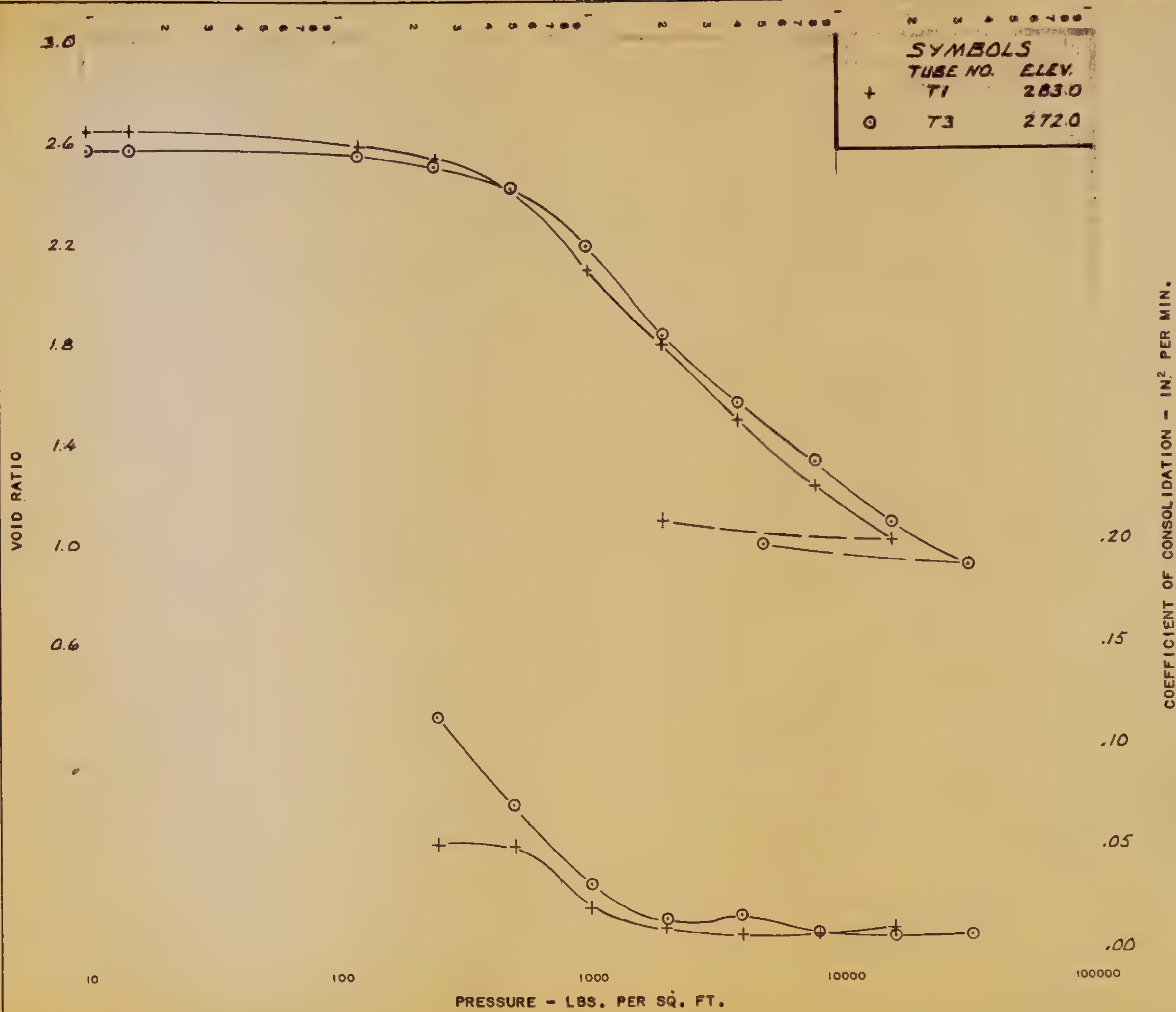
COMPRESSION INDEX ____

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840*

DRAWN BY *J. Mari* DATE *10/13/72*
CHECKED BY *R.S. Cheney* DATE *10/13/72*

SM 292 (11/67)

10 SM 1842 D



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 51B*
P.I.N. 0024.11.111

HOLE NUMBER *P66* DEPTH ______

STATION ______ OFFSET ______

LABORATORY NUMBER ______

DATA CODE ______ MACHINE NUMBER ______

VISUAL DESCRIPTION
VERY SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY ______ DATE ______

RANGE OF
CLASSIFICATION TESTS

MOISTURE CONTENT *94.0 TO 97.6* %
WET DENSITY *86.6 TO 89.5* PCF
SPECIFIC GRAVITY *2.57 TO 2.64*
LIQUID LIMIT *95.5*
PLASTIC LIMIT *39.6*
PLASTIC INDEX *55.9*
ORGANIC CONTENT ______ %

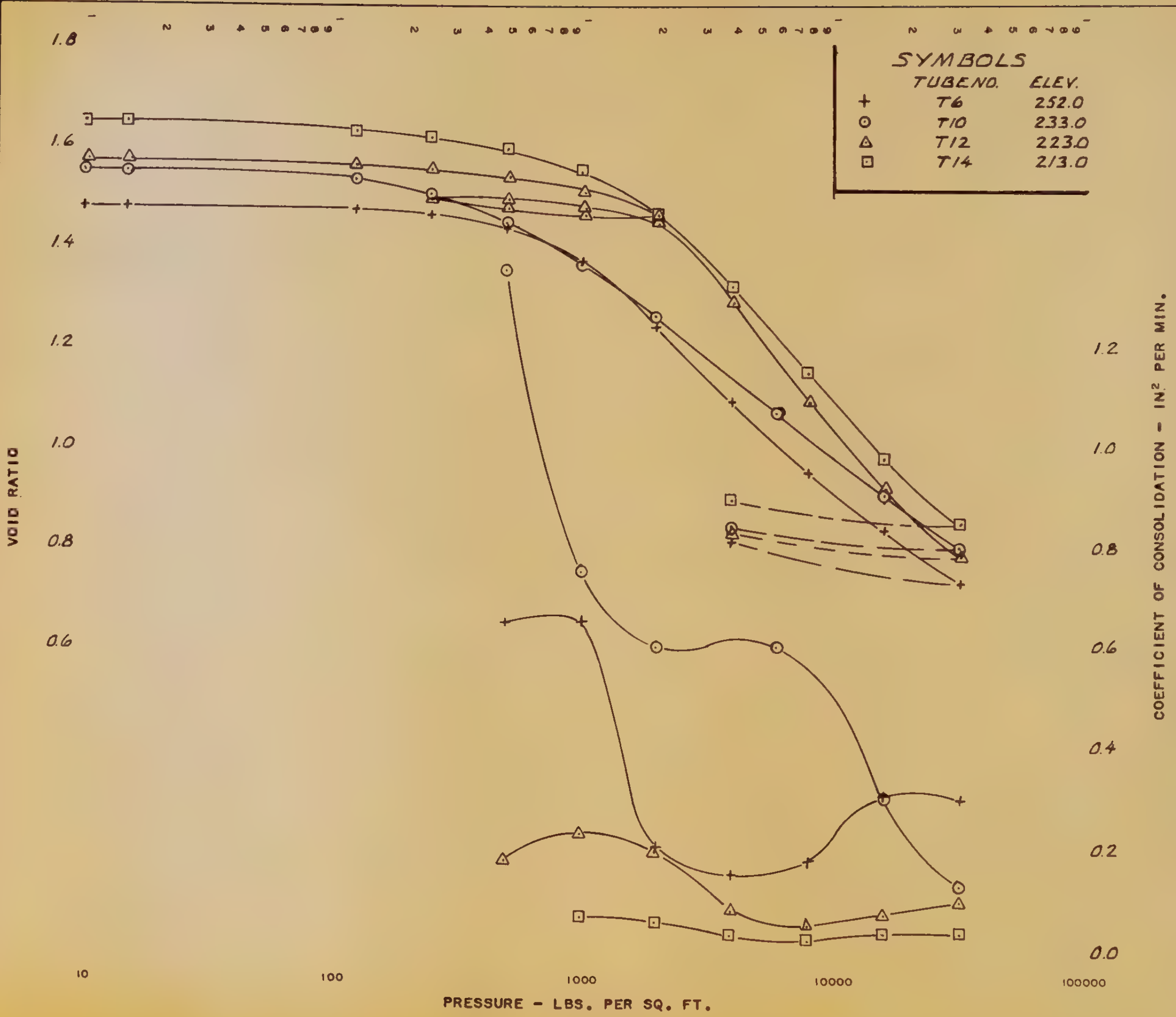
PERCENT FINER THAN
.074MM ______ .020MM ______ .002MM ______

PRECONSOLIDATION PRESSURE
MINIMUM ______ MAXIMUM ______

COMPRESSION INDEX ______

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840*

DRAWN BY *M.* DATE *10/13/72*
CHECKED BY *R.J. Cheney* DATE ______



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 518*
P.I.N. 0024.11.111

HOLE NUMBER *P66* DEPTH ______

STATION ______ OFFSET ______

LABORATORY NUMBER ______

DATA CODE ______ MACHINE NUMBER ______

VISUAL DESCRIPTION
SOFT GRAY ORGANIC SILT, WITH A TRACE OF SAND AND SHELLS

SAMPLE PROFILE

TEST SET UP BY ______ DATE ______

RANGE OF CLASSIFICATION TESTS

MOISTURE CONTENT	51.7 TO 60.5	%
WET DENSITY	100.3 TO 103.5	PCF
SPECIFIC GRAVITY	2.68 TO 2.70	
LIQUID LIMIT	56.0 TO 59.2	
PLASTIC LIMIT	28.0 TO 30.2	
PLASTIC INDEX	28.0 TO 29.0	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM ______ .020MM ______ .002MM ______

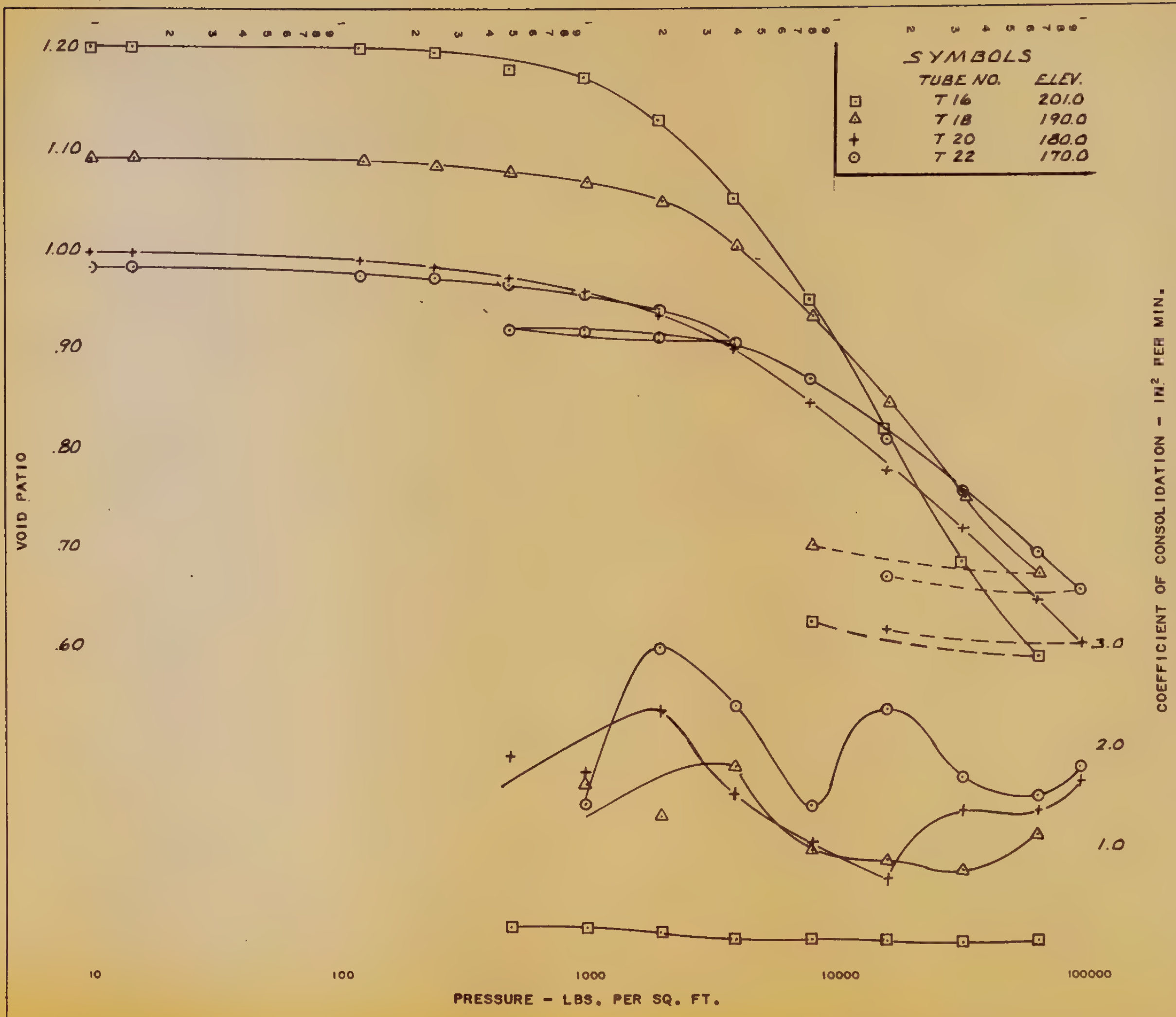
PRECONSOLIDATION PRESSURE
MINIMUM ______ MAXIMUM ______

COMPRESSION INDEX ______

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840*

DRAWN BY *J. M...* DATE *10/13/72*
CHECKED BY *R.S. Cheney* DATE *10/13/72*

SM 292 (11/67) 10 SM 1842 F



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 518*
P.I.N. 0024.11.111

HOLE NUMBER *P66* DEPTH ______

STATION ______ OFFSET ______

LABORATORY NUMBER ______

DATA CODE ______ MACHINE NUMBER ______

VISUAL DESCRIPTION
LOOSE LAYERED: GRAY ORGANIC SILT, WITH A TRACE OF SAND
GRAY SAND AND SILT

SAMPLE PROFILE

TEST SET UP BY ______ DATE ______

RANGE OF
CLASSIFICATION TESTS

MOISTURE CONTENT	*33.9 TO 38.4*	%
WET DENSITY	*110.9 TO 115.2*	PCF
SPECIFIC GRAVITY	*2.70 TO 2.72*	
LIQUID LIMIT	*29.5 TO 33.3*	
PLASTIC LIMIT	*23.2 TO 24.8*	
PLASTIC INDEX	*6.3 TO 9.6*	
ORGANIC CONTENT		%

PERCENT FINER THAN
.074MM ______ .020MM ______ .002MM ______

PRECONSOLIDATION PRESSURE
MINIMUM ______ MAXIMUM ______

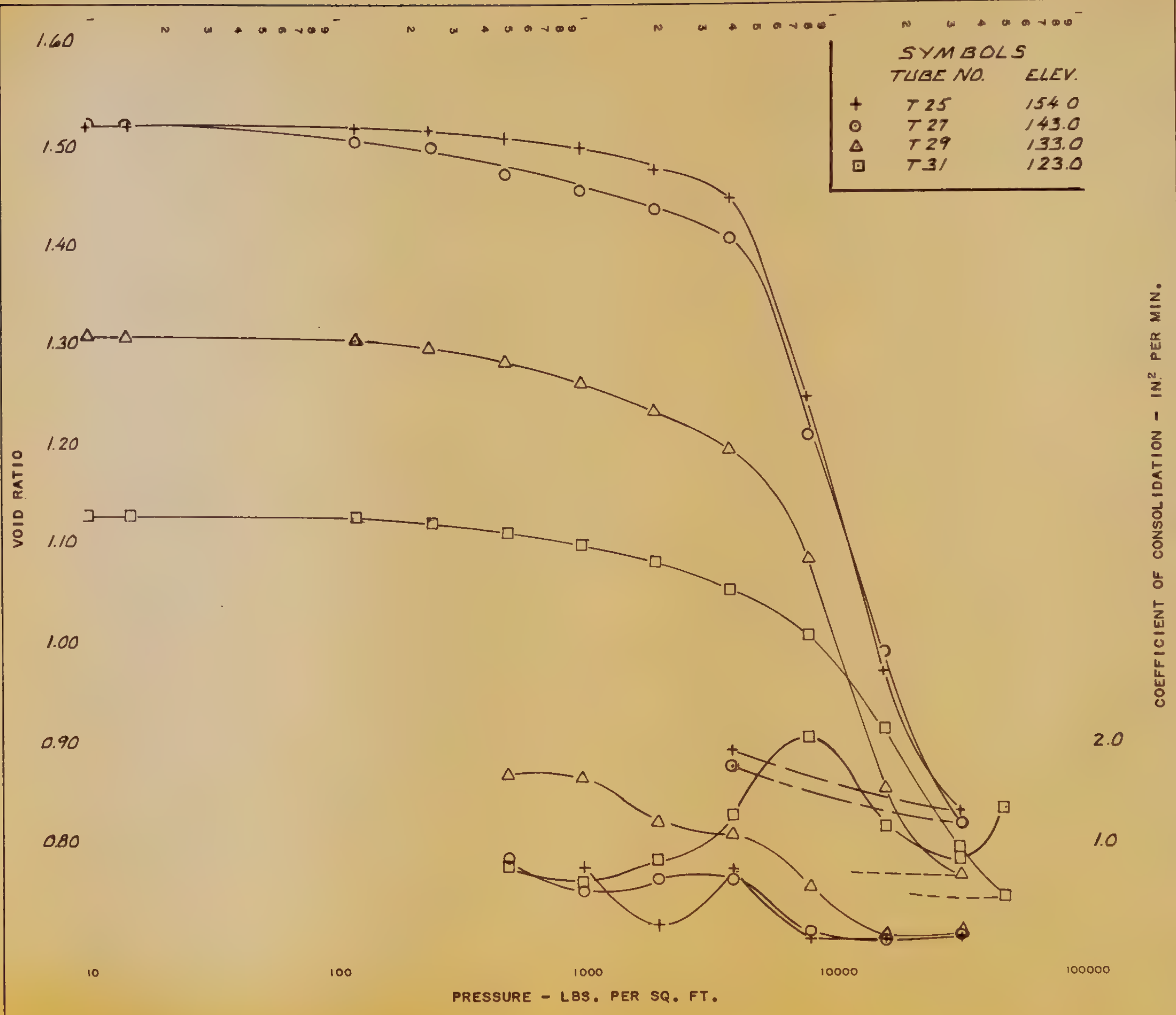
COMPRESSION INDEX ______

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840*

DRAWN BY *J. Morai* DATE *10/13/72*
CHECKED BY *R J Cheney* DATE *10/13/72*

SM 292 (11/67)

10 SM 1842 G



STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOIL MECHANICS BUREAU

CONSOLIDATION TEST

PROJECT *INTERSTATE ROUTE CONNECTION 518*
P.I.N. 0024.11.111

HOLE NUMBER *P66* DEPTH ______

STATION ______ OFFSET ______

LABORATORY NUMBER ______

DATA CODE ______ MACHINE NUMBER ______

VISUAL DESCRIPTION ______
MEDIUM COMPACT LAYERED; GRAY ORGANIC SILT, WITH A TRACE OF SAND
GRAY SAND AND SILT

SAMPLE PROFILE

TEST SET UP BY ______ DATE ______

RANGE OF
CLASSIFICATION TESTS

MOISTURE CONTENT	*54.7 TO 55.1*	%
WET DENSITY	*105.4*	PCF
SPECIFIC GRAVITY	*2.74 TO 2.75*	
LIQUID LIMIT	*49.4 TO 54.6*	
PLASTIC LIMIT	*22.6 TO 22.9*	
PLASTIC INDEX	*26.5 TO 32.0*	
ORGANIC CONTENT		%

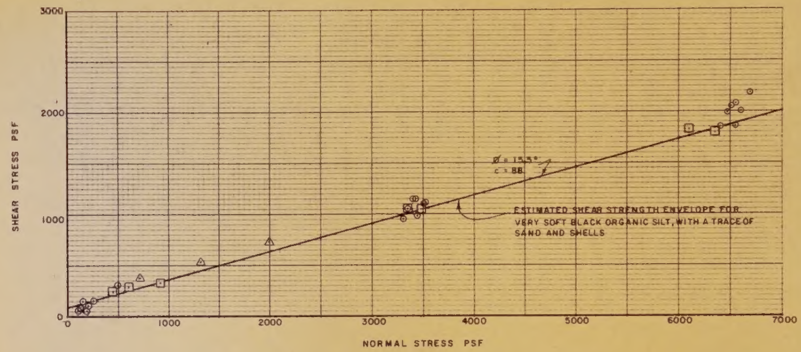
PERCENT FINER THAN
.074MM ______ .020MM ______ .002MM ______

PRECONSOLIDATION PRESSURE
MINIMUM ______ MAXIMUM ______

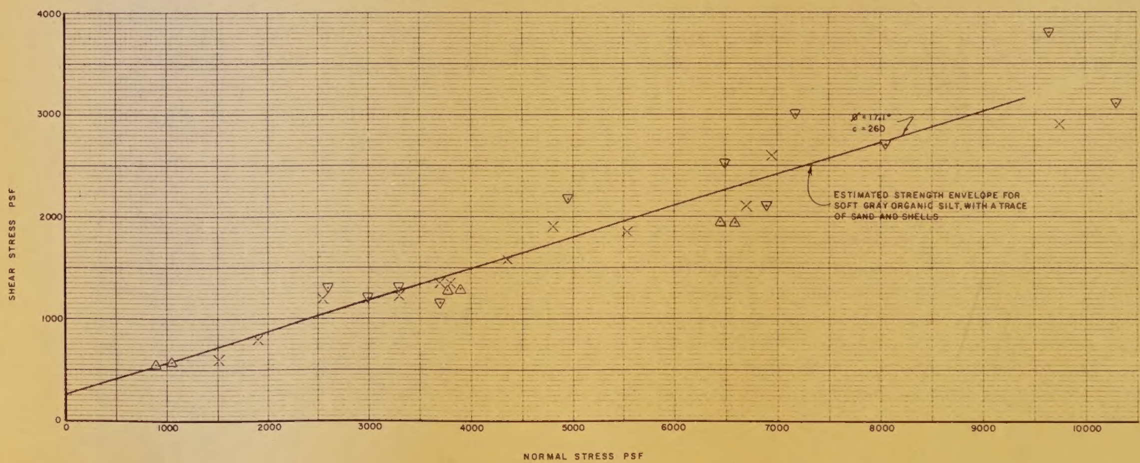
COMPRESSION INDEX ______

REMARKS: *FOR DETAILED SUMMARY OF CLASSIFICATION TEST DATA SEE DRAWING NO. 10 SM 1840*

DRAWN BY [illegible] DATE [illegible]
CHECKED BY *R.J. Cheney* DATE *10/13/72*



SYMBOLS	DRILLHOLE	ELEV. RANGE
⊙	P-21A	283-266
⊡	P-21	277-228
△	P-66	281-256



SYMBOLS	DRILL HOLE	ELEV. RANGE
△	P-40	256-226
▽	P-66	256-202
×	P-76	255-188

NOTE:
THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO. 10 SM 1840A-C

R1- REVISION 1 REVISED SHEAR STRENGTH PLOTS AND SHEET 10 SM1845 SUPERCEDED 4/1/77

PREPARED BY:
DRAWN BY:
CHECKED BY:

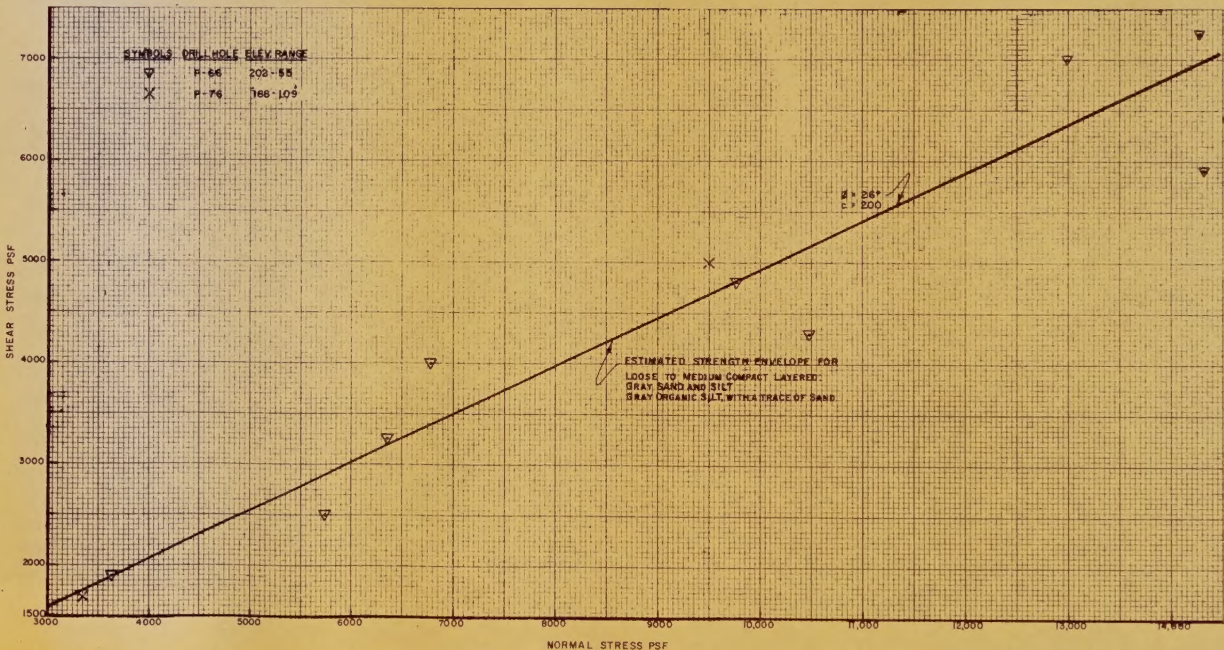
STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
P.I.N. 0024.11.111

CONSOLIDATED UNDRAINED SHEAR STRENGTH SUMMARY

APPROVED MARCH 31 1977
L. H. Moore
DIRECTOR

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 1845A R1



NOTE:

THE BASIC DATA FOR ALL STRENGTH TESTS ARE SHOWN ON DRAWING NO 10SM1840A-C

R1-REVISION 1 SHEET 10SM1845 SUPERCEDED 4/1/77

PREPARED BY: Emil E. Shyland
DRAWN BY: J.J. Masi
CHECKED BY: R.S. Cheney

STATE OF NEW YORK
DEPARTMENT OF TRANSPORTATION
SOILS MECHANICS BUREAU

INTERSTATE ROUTE CONNECTION 518
WEST SIDE HIGHWAY FROM THE BATTERY
TO 42nd STREET, BOROUGH OF MANHATTAN
PIN 0024 11.111

CONSOLIDATED UNDRAINED SHEAR STRENGTH SUMMARY

APPROVED Oct. 13 1972
Wm. P. Hofmann
DIRECTOR

REGION NO. 10
COUNTY NEW YORK
DRAWING NO. 10 SM 1845B-R1